

Railway Age

Vol. 85 December 8, 1928 No. 23
Name Registered U. S. Patent Office



On the Duluth, Missabe & Northern near Duluth, Minn

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Published every Saturday by the Simmons-Boardman Publishing Company, 34 North Crystal Street, East Stroudsburg, Pa., with executive offices at 30 Church Street, New York.

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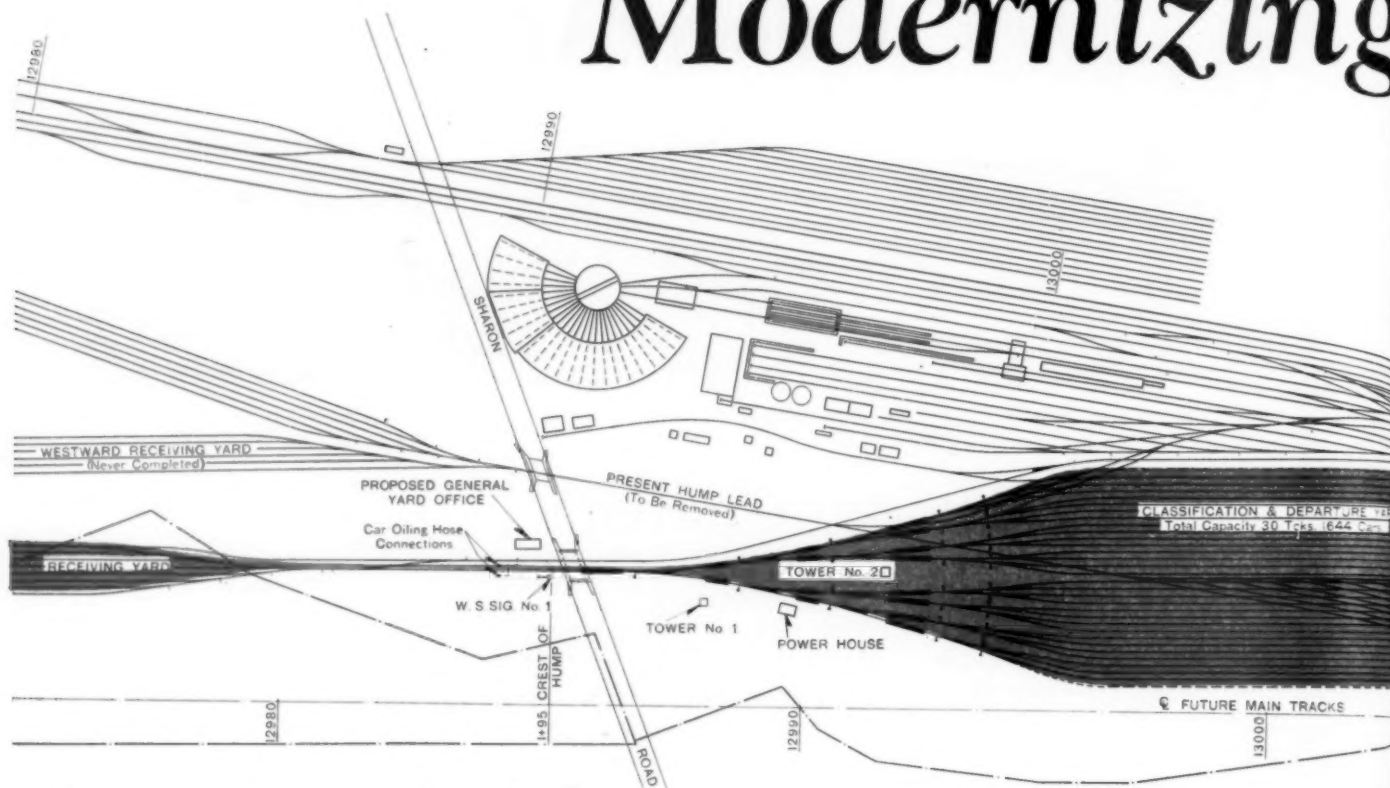
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The Railway Age is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free; United States, Mexico and Canada, \$6.00. Foreign countries, not including daily editions \$8.00.

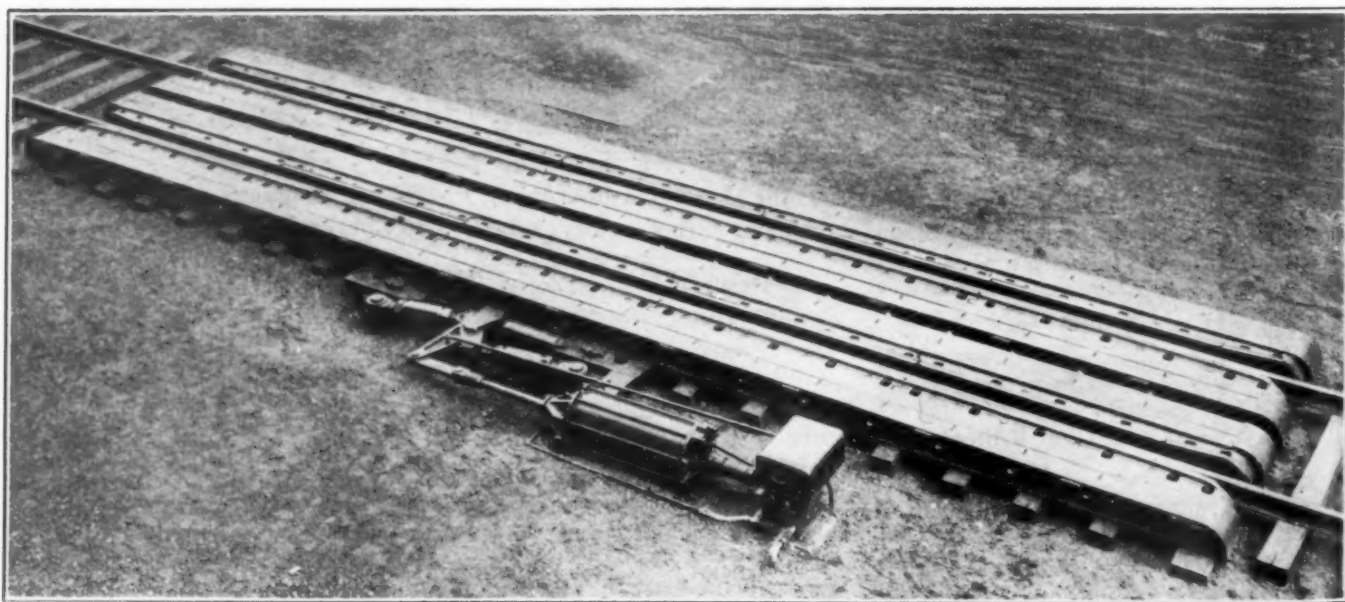
Subscriptions for the fourth issue each month only (published in two sections, the second of which is the Motor Transport Section) payable in advance and postage free; United States, Mexico and Canada, \$1.00; foreign countries, \$2.00. Single copies, 25 cents each.

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Railway Age

Vol. 85, No. 23

December 8, 1928

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November Equipment Markets

NOVEMBER was the third consecutive 1928 month in which freight car orders, as reported in the *Railway Age*, were substantially in excess of those reported during the corresponding month of 1927. A total of 6,100 units of this type of rolling stock was ordered during the past month, a figure which leads all 1928 monthly totals and which is approached only by the 5,876 units ordered in February and the 5,683 ordered in April. The November, 1927, figure was 789, or less than one-seventh of the 6,100 reported last month, while the October, 1928, total was 1,635, as against a figure of nine freight cars ordered during October, 1927. Likewise November locomotive orders were for 41 units as against orders for four in October and 22 in November, 1927. While passenger train car orders for November were under those of November, 1927, the eleven-month total for 1928 still remains approximately 40 per cent above the total for the corresponding eleven months of both 1927 and 1926. Although these eleven-month totals in locomotive and freight car orders still lag behind the comparable 1927 figures, the 1928 monthly totals have nevertheless been equal or above those of the previous year in the case of locomotives since July and, as was stated at the outset, substantially in excess of 1927 monthly totals in the case of freight cars, since September. Thus the trend toward a more favorable equipment market seems to become more definitely established as each succeeding month's orders are compiled.

Increased Safety and Reduced Cost of Highway Crossing Protection

IN YEARS gone by, the assignment of watchmen at crossings was considered the best means of protecting the users of the highways against approaching trains. Later the use of manually-operated gates, with a gateman at each crossing, came into vogue as an improvement. Such protection, inaugurated years ago by orders of municipal authorities or state commissions, has been continued with ever-increasing cost to the railroads for wages and operating costs. With the demonstrated superiority of automatic control for highway crossing signals certain railroads have replaced watchmen and manually-operated gates with automatic protection. In presenting a plea to local city authorities to make such a change railroad representatives can point to the fact that the automatic signals will be in operation the full 24 hours of the day rather than for the 12 or 16-hr. period common with the manual protection. Likewise, automatic protection is always on the job, not subject to forgetfulness or inattention. One road has recently placed an order for gates for 26 crossings, to be operated and controlled entirely automatically. The Wabash recently modernized its highway crossing protection in Wabash, Ind., rendering full-time protection where shorter hours had been in effect for watchmen and manual operation of gates.

This installation of crossing signals, as described elsewhere in this issue, includes a unique method of centralized manual control for the protection of certain crossings during the period when local freight trains are switching, the control being automatic during the remainder of the time. The two interesting results accomplished by this installation are the provision of full 24-hr. protection at 13 street crossings, as compared with only part-time manually-operated protection at 11 crossings, with a saving in wages of \$7,800, or enough to pay for the improvement in about two and a half years. The same results are possible on other roads in numerous localities by adapting automatic or centralized manual control for crossing protection to local problems.

The Superintendent and Safety

THE division superintendent is an officer who usually has little time to spare for activities that lie outside his immediate province. But safety is a matter that is closely connected with operating efficiency and as such it merits attention from even the busiest of superintendents. In this connection, the methods used by one superintendent are quite interesting. This man has charge of a busy 551-mile division in the southeast; yet he finds time and feels it his duty to promote safety actively. Among other measures, he sends out a special safety bulletin daily to all employees on the division. These bulletins are concise and contain a pointed message. The one for October 23 is typical: "By abstaining from most things, it is surprising how many things we enjoy. Abstain from unsafe methods all the time." These bulletins also contain short messages of other kinds; for instance, during the cotton-shipping season, there was this warning: "Prevent fire loss. Handle engines carefully around cotton platforms." The bulletins have become an institution on this particular division and they are read eagerly by the men. In addition, this superintendent aids the cause of safety by making talks on the subject throughout his territory. Through the local agents, the superintendent offers to speak at schools and other places in the small towns along the line. The response to this has been highly gratifying, and in a recent period of two weeks he spoke to more than 2,000 school children in the course of his trips over the division. In making these talks, he is usually accompanied by the mayor and the prominent citizens of the town. He spends ten minutes or so on safety and follows with some facts and figures on railways, with which they are not familiar, such as the amount of taxes paid. These talks never take more than 15 minutes, and this superintendent, at least, finds it convenient to make them as he goes over the line, without interfering with his other business. These methods are effective and helpful. They are adapted not only to increase railroad safety, but also to create a sentiment among employees and the public that is helpful to the railroads in dealing with other problems connected with their relations with the public.

Tentative Report on Trucking in New York

IN the tentative report and recommendations of Attorney-Examiner Harry C. Ames of the Interstate Commerce Commission on the subject of motor trucking in New York, students of the application of such vehicles to railroad service will find, we believe, a most valuable addition to the literature on this subject. This we believe to be true whether or not one agrees with the specific recommendations contained in the tentative report. Examiner Ames' accomplishment, regardless of one's opinions regarding his recommendations, has been to cut through an amazing tangle of complexities and expose and define a clean-cut problem. The problem he has hewn out of the jungle of conflicting testimony will not be an easy one to solve; yet with the under-brush of side-issues cleared away, it stands out definitely as a target at which definite aim can be taken. Briefly, Examiner Ames recommends that co-called "constructive station" and "trucking in lieu of lighterage" (except as between carriers) be found illegal; that "inland stations" be continued where desired by the carriers, but that the Commission is without authority to compel store-door or inland station service; that the Commission ask Congress for power to require motor truck service at terminals where public necessity may require. In lieu of "constructive station" service he suggests an alternative form of direct delivery which would give most of the advantages of this service without being subject to its reputed abuses. If the reasoning in this report is sound, it would appear difficult to establish store-door delivery, even in an attenuated form, without making the service general. Even if consignees and shippers using such service pay well for it, there are certain advantages inherent in it which, it would appear, would enable railway patrons in other localities where the service was not provided to complain that they were being discriminated against. Examiner Ames finds that the trucking of freight from the west bank of the Hudson to inland stations in New York costs about one-half as much as handling the freight through pier stations. He says also "the day may come, and no doubt will, when a common carrier by railroad will feel impelled to resort to motor trucks in co-ordination with its rail equipment . . ." This report will be published in abstract with further editorial comment in the next issue of the *Motor Transport Section*.

Careful Handling of Locomotive Fuel Required

DESIRABLE results in locomotive fuel economy can be secured only by the exercise of the greatest care during every phase of fuel handling. In the case of bituminous coal, for example, constituting roughly 90 per cent of the fuel used on locomotives in the United States, this care must begin with the preparation of the coal at the mines and continue uninterruptedly through such final steps as are taken to assure a minimum of unburned carbon in the cinder pit ashes. Particular attention to the preparation of coal was advocated by W. L. Robinson, superintendent of fuel and locomotive performance of the Baltimore & Ohio, in an unusually comprehensive and able paper entitled "Locomotive Fuel," read recently before the Second International Conference on Bituminous Coal at Pittsburgh, Pa. Obviously, the non-combustible content of locomotive coal, including both moisture and ash, must be paid for

at the same price as combustible, and in addition, it adversely affects the rate and efficiency of combustion. Mr. Robinson is authority for the statement that a difference of only one per cent between the ash content of prepared seam samples and actual shipment samples is common, but even at this rate the waste from excess ash alone amounts to 20 lb. per ton, or 1¼ million tons per annum (assuming 125 million tons total annual consumption), which would require for loading, 25,000 fifty-ton coal cars, or 213 trains, each a mile long. This waste material must be purchased, hauled to consumption points, tolerated as an undesirable agent in combustion efficiency and finally removed from ash pits, representing a total loss from beginning to end. The influence of grade or size of locomotive coal on stack loss must also not be overlooked, as road tests of stoker-fired locomotives are said to have shown "an increase of 20 per cent in consumption of 2-in. screenings as compared with mine run, and an increase of 25 per cent in consumption of ¾-in. screenings as compared with 2-in. screenings." Plainly, railway fuel officers and organizations deserve the heartiest support in their efforts to obtain the right kind of fuel from the mines as well as to secure its efficient use after distribution to the locomotives.

The A. S. M. E. and the Railways

THREE years ago it appeared to be the consensus of opinion of members of the American Society of Mechanical Engineers interested in railway work that the Railroad Division of the society should be discontinued. There were very good reasons for entertaining such an opinion at that time since it appeared evident that practically anything the A.S.M.E. might undertake in railroad activities would conflict with or duplicate the functions and activities of the Mechanical Division, A.R.A., and the 30 or more railway clubs and foremen's associations. Many of the members felt also that the addition of another organization to the large number already serving the interests of the mechanical department would serve no useful purpose.

It was, however, decided at that time to continue the division and, if possible, develop a distinct field in which it could serve not only the railroad, but the railway supply industry as well. Subsequent events have proved the wisdom of this decision, and it is now evident that the Railroad Division and the society as a whole have a number of important functions to perform for the two industries. A statement of what the Executive Committee of the Railroad Division considers these functions to be was published in the November 24, 1928, issue of the *Railway Age*, page 1037.

The meetings of the Railroad Division should afford an excellent means of contact between mechanical engineers in both the railroad and railway supply industries. But, from the standpoint of the railroad man, the programs of the Railroad Division are only incidental to what he can obtain in the way of valuable technical information from the society as a whole. For example, an excellent railroad program of thirty-three technical papers of which the Railroad Division, itself, sponsored only four, was presented during the recent annual meeting of the society. The division has already done constructive work in serving the interests of the mechanical engineer in the railroad field, and this work by all means should be continued. However, one of its most important functions will be to look after the interests of both the railway and railway supply industries in the numerous research and standard-

ization projects being sponsored by the American Society of Mechanical Engineers, either alone or in conjunction with other technical societies. Although most of these projects are of primary concern to the supply industry, nevertheless, the interests of the railroads are involved to some extent in a considerable part of this work. It is here that the Railroad Division will, in all probability, render its most valuable service to the two industries.

The Train Control Order Contains Certain Cautions

A NEW basis has been established for the installation of automatic train control, differing radically from that existing since 1922, when the first order of the Interstate Commerce Commission was issued. The railroads are not to be ordered to install any more train control at this time, according to the decision of the commission on November 27. Evidently the commission considers that its previous orders have accomplished their purpose of forcing extensive development of automatic train control. However, the report does not give complete relief from further activities regarding train control. The carriers are expected to undertake studies and tests to bring about standardization of train control devices so that they may be used in joint track and terminal areas. Further they are "in no way relieved from the responsibility which rests on them to provide additional protection where needed in territory now protected by automatic signals." This leaves the roads free to use train control, cab signals or other means as they see fit to secure additional protection on dense traffic lines. These are suggestions from the commission that the carriers should take into consideration if they desire to obviate further orders for train control. In fact, the Bureau of Safety is definitely instructed to keep in touch with future developments and report to the commission.

In the conclusions of the report, the commission makes the statement that, "It has been shown in this case that the number of accidents and casualties, which result from disregard of fixed signal indications, is relatively small in comparison with those which result from other causes set forth in this record." This indicates that the commission recognizes the effectiveness of automatic signals as a means of protecting train movements. The commission requested complete information on automatic block signals when this case was opened in August, 1927. The report listed 19 roads on which certain divisions not now protected by automatic signals have been handling over 1,000 trains each month. However, no signal installations were ordered and although the report does not explain the matter, Commissioner Eastman, in his dissenting opinion stated that, "the records indicate that the carriers may be expected to make satisfactory progress in extending their use, especially since such signals often promote efficiency of operation as well as safety." This "word to the wise" should be sufficient for those carriers on which heavy traffic is being handled without automatic signals and where anything less than a strict manual block is in effect. Several automatic signal installations have been held in abeyance for the last year and a half, awaiting the decision of the commission on train control. Now that the railroads have been relieved from this anxiety, it is to be expected that automatic signaling construction programs will be increased for 1929.

In the conclusion of the report, the commission states that, "we have concluded not to require by order at the present time further installations of train control. The carriers should be diligent in their efforts to provide adequate protection against accidents due to grade crossings, derailments, collisions in territory not now protected by block signals." In other words, the commission has placed on the carriers greater responsibility for accidents in such cases because several carriers pleaded during the hearings in this case that they preferred to spend their money for these other purposes rather than train control. Now that the train control situation is relieved, the railroads are naturally expected to correct these other situations. The relief from extensive train control orders seems to be contingent on the activity shown by each road in meeting its particular requirements for safety.

Cost of Transportation by Water and by Rail

THERE is only one argument for the development of inland waterway traffic which, if it can be supported by facts, is valid. This is that it will result in reducing the total cost of transportation of freight. Various other arguments are used. One is that inland waterway service is needed to "relieve" the railways. This argument is fallacious because the railways now have ample capacity and there is no physical limit to the extent to which their capacity can be enlarged. Another argument advanced is that the saving in freight rates resulting from the freight being carried at lower rates by water than by rail confers indirect benefits upon agriculture and industry several or many times exceeding the saving in freight rates. It is perfectly evident, however, that a given saving in freight rates by rail will have exactly the same effects upon industry and agriculture as the same saving in rates by water. Therefore, if the saving in rates made by water is due to a subsidy from the government to the water carriers, it is plain that the same indirect effects could be produced by an equal reduction in the rates by rail made as a result of the government giving an equal subsidy to railways.

The question as to whether freight can be handled cheaper by inland waterway than by railway is complicated by the necessity of making allowances for differences in the character of the service rendered. For example, the government barge line transports package freight from New Orleans to St. Louis in 12 days. The competing railways transport it between the same points in three days. Plainly, it would not be fair to compare the costs by the two means of transportation without taking into consideration the fact that the service rendered by the railways is much faster.

However, the *Railway Age* never has conceded that the cost of transportation by inland waterway can be made as low as by rail, regardless of differences in the character and value of the service rendered. The comparative rates paid by the shipper by water and by rail prove nothing as to the comparative total costs of transportation. The rates by rail include all the costs of transportation that are paid by anybody. The rates by inland waterway never include a return upon the investment in the waterway or a contribution toward the expense of maintaining it. There are still other costs of carriage by water that are disregarded by those

who are claiming that large "savings" are being made by the operation of the barge line of the Inland Waterways Corporation, which is owned by the federal government. These claims are such that they demand attention. They are being effectively used as arguments for the extension of the government's barge line service. The more that service is extended the more the railways will have to compete with the government of the United States, which is a dangerous competitor because it has such a long purse.

What, then, are the facts regarding the comparative costs of transportation by the barge line and by the railways? Is it true, as is being so widely heralded, that the operation of the barge line is resulting in large "savings" to the public? It is impossible to state all the facts accurately because official reports do not afford material for doing so. But let us see how the costs of the barge line in 1927 would have looked if they had included some items of cost they should have included and which the railways cannot avoid.

Costs by Barge Line

The barge line's gross earnings in 1927 were \$6,159,433. Its financial results in that year were the best since it has been operating, excepting in 1926, and are the latest for which data are available. Its reports indicate that its rates average about 20 per cent less than those of the parallel railways for handling the same freight. On this basis if the freight handled by it had been handled by rail, the total charges upon it would have been about \$7,700,000, or about \$1,540,000 more than they were. The controller of the waterway corporation estimates, however, that the saving in freight rates was \$2,302,000, and on this basis the charges by rail would have been about \$8,461,000. There are reasons for believing this estimate is exaggerated, but, for purposes of discussion, we will take it as representing the direct saving in freight rates.

But what did the service rendered by the barge line actually cost? Its operating expenses, including depreciation, as reported, were \$6,181,241. The expenses of its Washington office were \$73,233, while other items mentioned by the controller, including a loss on its Warrior river terminal company, a loss on property and equipment and settlement of prior claims, totaled \$139,546. In addition, we must consider its capital costs. Its investment in property was \$14,907,308. The public pays interest upon this. A private company would have to pay a return upon it or become bankrupt. The government charges the railways interest on its loans to them at the rate of six per cent. Interest at this rate on the investment in the barge line would have been \$894,438. A private company would have to pay taxes. The taxes of the railways were 6.13 per cent of their total earnings. At this rate the taxes of the barge line would have been \$377,573. When we add together the operating expenses of the barge line and the other amounts mentioned we get a total of \$7,666,031. This is almost exactly what the charges for the service by rail would have been at rates 25 per cent higher than by water, but, on the controller's estimate of a saving of \$2,302,000 in rates, is about \$785,000, or 9 per cent, less than the charges by rail would have been.

But the figures given still do not include all the costs incurred in handling the traffic by water. They do not include interest upon the investment in and operating costs of terminals at numerous points which are used by the barge line, which, if included, probably would demonstrate that the total costs properly charge-

able to the barge line service exceed the total rates that would be charged by rail for the same service. Finally, in comparing costs by inland waterway and by railway, consideration must be given to interest upon the hundreds of millions of dollars that the public has spent in improving the waterways and the cost now being borne by it in maintaining them and keeping them in navigable condition.

Inferiority of Water Service

Furthermore, as already intimated, the service by water is inferior to that by rail. The railways carry package freight in three days between St. Louis and New Orleans. By water it takes 12 days in moving from New Orleans to St. Louis, and six days in moving from St. Louis to New Orleans. The heavy tow service by water provides for sixteenth-morning delivery from New Orleans to St. Louis and sixth-morning delivery in the reverse direction. The comparable service by rail provides fourth-noon delivery in both directions. Ninth-evening delivery by water is provided in Minneapolis from St. Louis and sixth-evening delivery in the reverse direction. This compares with third-morning delivery in both directions by rail.

The Railroad Administration roughly approximated the relative value of the slower and less frequent barge service at 80 per cent of the cost of rail service between competitive points. The additional, but incomplete, cost items listed above, bring the total waterway cost to 91 per cent of the possible maximum rail charges. Thus, for a service worth only 80 per cent of the rail service, expense items easily ascertained and applicable to private operation of the barge line bring the incomplete cost of this water service up to 91 per cent of the cost of the corresponding rail service.

It may be said that the barge service is still "experimental" and that the savings effected will be larger when it is in full operation on the Missouri river to Omaha, on the upper reaches of the Mississippi and on the projected deep waterway to Chicago. It seems much more likely that the more the barge line is extended the larger will be the losses incurred by it. Most of its service is now rendered on the lower part of the Mississippi, where nature and government expenditures have provided the best channel available in the entire Mississippi valley waterway system. On its lower Mississippi division its operating expenses in 1927 were only 95 per cent of its earnings, while on the Warrior division they exceeded the earnings by 22 per cent and on the upper Mississippi division they were almost three times as great as the earnings. Service can be rendered throughout the year on the lower Mississippi, but cannot be rendered during the winter on the northern parts of the waterway system. With shallower channels and fewer months' operation each year on the northern parts, it seems an idle dream to expect that it will ever be possible, excepting perhaps on the lower Mississippi, to render waterway service at rates lower than those by rail, without heavy losses to the taxpayers. On the other hand, of course, unless the rates are made lower than by rail the waterways will not get the traffic.

The agitation for inland waterways has been carried on a long time. It has heretofore done the railways little harm because experience has shown that privately-owned and operated carriers on canals and rivers cannot render good enough service at low enough rates to compete with the railways. The present agitation is dangerous to the railways because it has put forward the United States government, with its long purse, as

a competitor. Those who have been active in promoting government ownership and operation of the barge line concede that when it has been made a "success" it should be turned over to private enterprise. They also concede, either directly or by implication, that if it is a failure it should be abandoned. The trouble is they do not set up any standard for determining whether it is a success or failure. By expatiating upon the "benefits" now being derived from it they imply that it is already a success, in spite of the fact that it has failed to earn its operating expenses in every year excepting one, and has incurred a large deficit in every year, if allowance be made for taxes and interest on investment.

The barge line may take a large amount of traffic from the railways, but if it does it will be at the cost of large deficits which will be paid from taxes. The American public has spent hundreds of millions of dollars upon inland waterways without getting any appreciable return from their investment, excepting on the Great Lakes. There is nothing in the results of operation of the government's barge line to date that indicates that the results of prospective expenditures of hundreds of millions more upon inland waterways will be more favorable.

Why Should Shippers Favor Cost Accounting?

HEARINGS in the depreciation accounting and accounting revision cases have now ended. The next step will be the serving of tentative findings by the Interstate Commerce Commission. Not till then will briefs be filed. Meantime retrospect on the several hearings in these cases and the volumes of testimony taken discloses as perhaps the most singular feature the participation of the National Industrial Traffic League. Entering the case on its own initiative or at the instance of the Commission (there is apparently some conflict in the evidence on this point), the league retained a witness who has spread on the record and endeavored to defend a "cost accounting" plan for railroad service.

At the annual meeting of the league in New York on November 22-23 the special committee on railroad accounting presented a report to the membership on the progress of the hearings. This report, with all fairness to the league's accounting committee which is undoubtedly sincere in its opinion, must be characterized as partisan pleading rather than unbiased, informative document. In view of this fact we believe it proper to raise the question: Does the "whole-hearted backing of the league membership," which counsel solemnly assured the Commission has been accorded this plan, come from a real understanding of the case, or as a result of the committee's one-sided presentation?

We have yet to hear of any person intimately connected with and well informed on railroad accounting who believes the cost accounting methods of other industries to be feasible or useful in railroad service. The principal difficulty arises from common expenses, which can be assigned to different services and commodities only by the use of arbitrary formulas, none of which are more than approximately satisfactory. The railroad's position is that cost data, where required, can be obtained by special studies. These studies, the rail-

roads assert, being confined to given situations, should approach much nearer to accuracy than could uniform continuous accounting. How in justice, the railroad accounting officers might inquire, can officers who are required to swear to the accuracy of their reports be asked to subscribe to figures obtained by applying formula upon formula, none of which are free from error? When estimates and speculative averages are required, the accountants say, why not admit the limitations of such compilations, use them carefully and call them frankly statistical computations? To force guesswork into the accounting structure, it is believed, could not fail to mislead those who expect accounts to reflect facts accurately.

These are the views of leaders not only in railroad accounting, but in railroad economics as well. They are mentioned here because they are the sort of information brought out in the hearings, which the report of the National Industrial Traffic League's committee on railroad accounting did *not* impart to the membership of the league.

Counsel for the league assured the commission that the league was spending more money on this case than it ever had previously spent on litigation and that its proposal was heartily endorsed by the membership. Do the members of the league know that the Commission's own Bureau of Accounts, and leading economists generally have pointed out the inapplicability of cost accounting methods to railroad service? As a matter of fact the league's own plan is not a complete cost accounting plan, if it is rates based upon costs which the league is seeking. The plan as presented would not give cost data on individual commodities to enable the fixing of rates based on costs. On page 84 of the record, J. W. Roberts, the league's witness testified:

For current cost accounts to comprehend each and every kind and class of business moving, furthermore, takes in too much territory, in our judgment, and would exceed the practical requirements.

Just what advantages the plan as presented would have either for shippers, regulatory bodies or management is a question which those who are "whole-heartedly" backing this plan may answer for themselves.

The league cannot be blamed for doing as it pleases. It has a legal right to go before the Commission and advocate anything it desires. Generally its views are logical, at least to the point of showing intelligent self-interest, even though we do not always agree with them. When, however, its recommendations are as far out of line with sound policy as we believe them to be in this instance, we permit ourselves to wonder: How far do these opinions represent the considered opinion of the league's members? To what extent has action been based on misunderstanding?

In talking over this plan with a league member the other day we found that he knew nothing about the league's activity in this case. "Why," he said, "we want less red tape and less figuring—not more."

We believe there are many big shippers who would take the same stand if they realized that competent authorities had estimated that the cost of this plan to the railroads if carried to its logical conclusion—i. e., giving cost figures on individual commodities—would be more than \$100,000,000 a year; that a burden as heavy each year as the total cost of valuation to date is but the next step beyond the league's proposal. How much would these shippers wish to have rates on their products raised to pay for so large an increase in expense?



The Bridge Over the Miami River Near Woodsdale

New Bridges Carry E-90 Loading

*Baltimore & Ohio builds line to carry hot metal cars having
a weight of 343 tons on 8 axles*

By P. G. Lang, Jr.

Engineer of Bridges, Baltimore & Ohio, Baltimore, Md.

A PLAN for the hauling of hot metal over 11 miles of railroad in cars having a loaded weight of 343 tons on 8 axles—equivalent to Cooper's E-90 loading—created some unique problems of railway construction and maintenance, and bridge design for the Baltimore & Ohio in connection with improvements in the metal producing facilities at Hamilton, Ohio. The furnace of the Hamilton Coke & Iron Company, immediately north of Hamilton, was rehabilitated and enlarged, with the particular object of supplying hot metal to the plant of the American Rolling Mill Company, at Middletown. The safe and expeditious transportation of such lading by railroad is a matter attended by some obvious difficulties and required careful study from both engineering and operating standpoints.

Hamilton Furnace is situated on the main line of the Baltimore & Ohio between Cincinnati, Ohio and Toledo, and the plant of the American Rolling Mill Company is located on a branch extending from Hamilton to Middletown. The use of the existing railroad facilities would have involved the movement of the hot-metal cars over a rather circuitous route, leading from the furnace southward to and through Hamilton, and thence northward to destination at Middletown, a total haul of approximately sixteen miles. Movement by this indirect route would have been attended by serious disadvantages, including the obvious dangers incident to the presence of carloads of molten metal on main-line, high-speed tracks, and the possibility of delays en route of such duration as to impair the quality of the metal for manufacturing purposes.

Develop Independent Line

A practicable and satisfactory solution was found in the construction of a connecting line, approximately 23½ miles in length, extending from a connection with the main line at Hamilton Furnace across the Miami river at Woodsdale, to a junction with the Middletown branch

on the east bank of that stream; and the strengthening of bridges and track on the Middletown branch between that point and the junction of that branch with a new connection leading into the plant of the American Rolling Mill Company at Middletown. By this arrangement the length of the haul was reduced more than five miles, making the actual distance traversed by the hot metal in its journey from the furnace to the rolling mill about eleven miles. The general layout of these connecting lines is shown on the map.

The new connection extending from the main line at Hamilton Furnace to a juncture with the Middletown branch, on the east bank of the Miami river, presented no unusual difficulties in so far as the location and construction of the track and roadbed were concerned, and, on this section, the maximum grade is 0.5 per cent and the maximum curvature 8 deg. On the new connection extending from the Middletown branch to the team tracks in the yard of the American Rolling Mill Company, the physical conditions are somewhat more adverse, and it was necessary to provide a bridge over Yankee road, an important thoroughfare, and the line of the Cleveland, Cincinnati, Chicago & St. Louis. Between the Middletown branch connection and the west end of the Yankee road structure, the track rises on a maximum grade of 1.5 per cent reaching a summit on a vertical curve approximately at the Big Four crossing, and descending thence at a maximum grade of 0.9 per cent to the team tracks in the rolling mill yard.

New Bridges Required

The exigencies of the industrial arrangement in this area demanded that the new transfer facilities be available for use with the minimum delay. The situation and routing of the connecting lines involved the construction of a new bridge, approximately 900 ft. in length, crossing the Miami river at Woodsdale; a heavy fill supporting



The Viaduct Built by the American Rolling Mill Company



This Structure Consists of Eight Spans of 100-ft. Deck, Plate Girders

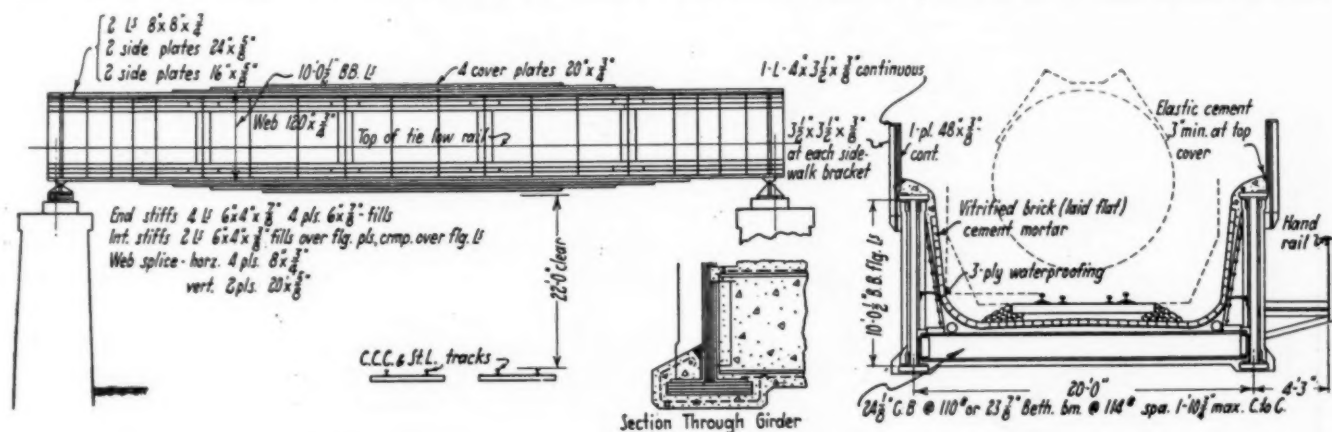
the tracks of the new spur at Middletown between the connection with the Middletown branch and the crossing of Yankee road; a plate girder viaduct, about 800 ft. long, extending from Yankee road to Lebanon Canal road and crossing these thoroughfares and the tracks of the C. C. C. & St. L.; and a timber trestle extension of this viaduct, about 940 ft. in length, terminating at the team-track facilities in the yard of the American Rolling Mill Company plant. From this main spur another connection was built by the rolling mill company, extending into its plant at Middletown.

In addition to the physical difficulties of the project, and the desire to expedite the work to the utmost, the situation was further complicated by the necessity of meeting the requirements of several local jurisdictions,

16 in. by 23 in. The ladles are provided with fire brick lining, 11 in. in thickness, and the cars are to remain in service until the thickness of this lining is reduced to 4 or 5 in.; consequently the weight and volume of hot metal comprised in each cargo will be subject to a progressive increase within established limits. The ladle is pivoted two inches below the turning point of the trunnions, and can be tilted only by the application of electric power, it being necessary that the car be standing when the electrical connections are made for this purpose.

Required Heavy Girders

The girders required to carry such heavy live loading are necessarily much heavier than girders of the



Details of the Heavy Through Girder Span 87½ ft. Long Over the Big Four Tracks

including the Miami Conservancy district and the town and county authorities.

Unusually Heavy Equipment

The ladle cars adopted for the movement of hot metal under this arrangement are of a new and very heavy type with an over-all length of 56½ ft. and a weight under load of approximately 685,000 lb. Each car is supported on eight axles, four axles grouped at each end, with a center-to-center spacing of 5 ft. 3 in. and 4 ft. 9 in. Under these conditions, when two of these hot metal cars are coupled together, eight axles, carrying loads of approximately 85,600 lb. each, are assembled within a distance of approximately 41 ft. representing a live load of about 16,000 to 18,000 lb. per lin. ft. The dimensions of the journal boxes are about

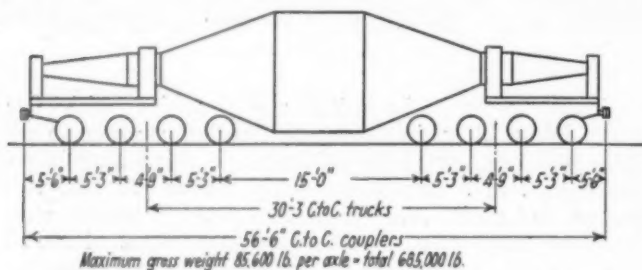
same length designed for usual railway use. This is particularly true of the through plate girder span over the Big Four tracks, since this span has a concrete, ballasted floor and the concrete is carried up the insides of the girders and over the top flanges and is covered with a protection of vitrified brick. The girders are 87½ ft. long and weigh 118,230 lb. each. All other spans in the new bridges are deck plate girders and have open floors, except that over Yankee road which has a concrete floor. The track is laid with 130 lb. rail on heavy ties, which are tie plated throughout. In the construction of the substructure for the Miami River bridge at Woodsdale, which includes seven piers and two abutments, pneumatic caissons were used.

The timber trestle, approximately 940 ft. in length, extending from the east side of Lebanon Canal road



View of the Viaduct Over the Big Four and Yankee Road

to the team tracks, consists of a series of frame bents, composed of preframed and treated timber, footed on concrete pedestals. Trestle construction of this type, that is, with concrete pedestals that keep the wood clear of the ground, and situated in a flat country where it is exposed to no exceptional conditions tending to occasion deterioration, is somewhat unusual. Conse-

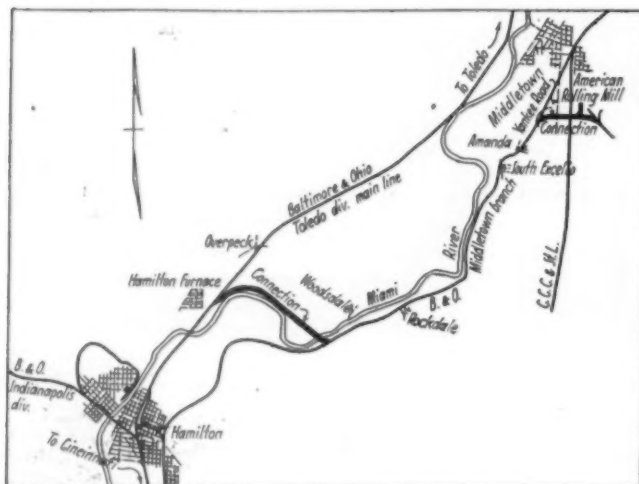


Wheel-Load Diagram of the Hot Metal Cars

quently the behavior of this structure under traffic and the duration of its service life will be observed with peculiar interest.

Rapid Construction Progress

Work on this line was commenced actively in the field about October 10, 1927, and was pushed with the utmost dispatch. The tracks were ready for service under the contemplated arrangement by February 29,



How the Hot Metal Moves From Hamilton Furnace to Middletown

1928, a total of 117 working days having been consumed, including time lost by inclement weather. The order covering the structural steelwork required for the bridges, comprising a total of approximately 3,800,000 lb., was placed on September 26, 1927 and delivery was commenced early in November. Erection was undertaken as soon as the general condition of the work on the project permitted and was prosecuted with the utmost rapidity. The bridge structures on this line required a total of approximately 15,500 cu. yd. of concrete, and about 241,000 ft. b.m. of timber in the bridge floors and 182,000 ft. b.m. in the trestles. Grading on the project totalled about 300,000 cu. yd.

The work was performed under the general supervision of H. A. Lane, chief engineer, of the Baltimore & Ohio. Direct charge of the field work devolved upon A. H. Griffith, district engineer at Cincinnati, Ohio. The design, fabrication and erection of the bridges were supervised by the writer.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading during the week ended November 24 amounted to 1,028,690 cars, a decrease of 31,011 cars from the total in the preceding week due to smaller loading of all commodities with the exception of coal and forest products. The week's loading was larger by 188,048 cars than in the corresponding week of last year, however, and the total also represented an increase of 90,846 cars over the corresponding week of 1926. Loading of all commodities and classes of freight was larger than a year ago and coal and coke only showed a decrease as compared with the commodity classification totals two years ago. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, November 24, 1928.

Districts	1928	1927	1926
Eastern	234,301	180,907	210,004
Allegheny	214,562	168,181	201,264
Pocahontas	60,969	45,210	61,590
Southern	154,119	134,958	146,618
Northwestern	120,857	105,068	102,508
Central Western	156,211	131,241	135,784
Southwestern	87,671	75,077	79,676
Total Western Districts	364,739	311,386	318,368
Total All Roads	1,028,690	840,642	937,844
Commodities			
Grain and Grain Products	54,739	42,755	38,911
Live Stock	32,894	28,141	29,367
Coal	200,892	152,794	227,877
Coke	10,559	9,260	12,720
Forest Products	64,901	56,005	59,206
Ore	17,752	11,030	14,494
Merchandise L. C. L.	259,715	225,629	229,102
Miscellaneous	387,238	315,028	326,167
November 24	1,028,690	840,642	937,844
November 17	1,059,701	968,052	1,071,707
November 10	1,053,295	975,134	1,106,889
November 3	1,103,342	1,039,075	1,131,832
October 27	1,112,976	1,112,976	1,208,878
Cumulative total, 47 weeks	47,162,953	47,460,539	48,608,428

The freight car surplus during the period ended November 15 averaged 162,314 cars as compared with 129,151 cars on November 8. The total included 80,817 box cars, 44,736 coal cars, 19,996 stock cars, and 7,662 refrigerator cars. For the period ended November 23 the surplus averaged 194,092 cars, including 56,695 coal cars and 96,696 box cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended November 24 totalled 85,970 cars, an increase over the previous week of 2,870 cars and an increase of 5,464 cars over the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Totals for Canada		
November 24, 1928	85,970	40,380
November 17, 1928	83,100	39,931
November 10, 1928	93,514	39,810
November 26, 1927	80,506	33,801
Cumulative Totals for Canada		
November 24, 1928	3,360,282	1,861,319
November 26, 1927	3,071,176	1,753,596
November 27, 1926	2,955,819	1,759,934

ORDERS FOR THE ABOLITION of highway grade crossings on the line of the Staten Island Rapid Transit Company and the Long Island Railroad, which orders have not been obeyed with diligence, have been made the subject of suits in the Supreme Court of New York. The State Transit Commission applies for writs of mandamus requiring the company in each case to proceed to submit plans and specifications.



The Locomotive is At Present Geared for Passenger Service

Canadian National's New 2660-Hp. Oil-Electric Locomotive

*Each of the two units is equipped with one 12-cylinder
V-type, solid injection, oil engine*

THE Canadian National Railways have placed in operation the first unit of a 2660-hp. oil-electric locomotive on their lines between Brockville and Belleville, Ontario, a distance of 95 miles. This locomotive, the largest and most powerful of its kind, has made its appearance in just a little over three years after the first oil-electric rail car of 200 hp. rating on the lines of the same system.

The locomotive, consisting of two units, weighs 650,000 lb. when fully equipped, of which 480,000 lb. is carried on the driving wheels. Each unit consists essentially of an oil engine generator set mounted on the locomotive frame, boiler equipment for steam heating of passenger coaches, four traction motors for propelling the locomotive, air brake and other auxiliary equipment.

The power developed by the oil engine is converted into electrical energy by the generator and transmitted to the traction motors geared to the driving axles. With the present gear ratio which was laid out for high-speed passenger service, the locomotive will develop a tractive effort of 100,000 lb. during accelerating periods and 42,000 lb. continuously. The electrical system of transmission utilizes full engine horse power over a wide range of speed and tractive effort of the locomotive in either direction without change of engine speed or shifting of gears.

The operation of the locomotive and the speed of the oil engine are controlled from either of two engine-man's stations, which are located in separate compart-

ments at the outer end of each unit. Means are provided for the control of both units jointly, or either unit independently of the other unit, from these stations. Gages are mounted at each engine-man's station for indicating the operation of each unit.

Twelve-Cylinder Engines

Each unit contains a Beardmore twelve-cylinder oil engine of the solid injection type, 12 in. bore and 12 in. stroke. The nominal rating of the engine is 1330 hp. at 800 r.p.m. The engine is of the variable speed type, and may be run at any speed between idling speed at 300 r.p.m. and full speed at 800 r.p.m., the engine governor controlling the throttle to maintain the speed corresponding to the governor setting. A fractional horsepower electric motor, controlled from the engine-man's station, is used for changing the speed setting of the governor. The engine develops its rated horse power at a fuel rate of 0.43 lb. per b.hp. hour. It will develop reduced power as may be required in locomotive service, with but a slight increase in the fuel rate per b.hp. hour. The engine is started from standstill by power taken from a storage battery on the locomotive, using the main generator as a motor to start it. The oil engines were designed and supplied by the William Beardmore Company, Glasgow, Scotland.

The cooling of the oil engine is accomplished by circulating the engine jacket water through radiators of the honeycomb type mounted on the locomotive roof. The lubricating oil is circulated through tubular finned

type radiators, which are also mounted on the locomotive roof. Both sets of radiators are force ventilated by motor-driven blowers of the propeller type, although the natural ventilation resulting from the locomotive speed will be sufficient to cool the engine during cold weather, and will assist materially in cooling it at other times. The radiator blower motors are controlled by separate thermostats placed in the water and oil to maintain desirable operating temperatures for each. Means are provided for by-passing a part or all of the water radiators during initial warming up periods.

Exhaust Heat Aids Oil-Fired Boiler to Heat Train

The exhaust gases of the oil engine are conducted to an economizing boiler located in the cab and finally discharged to the atmosphere at a reduced temperature. The economizing boiler also serves as an effective silencer in muffling the exhaust of the engine. The heat saving in the exhaust gas is sufficient to heat a passenger train of an average number of cars for outside temperatures as low as 12 deg. Fahr. below zero with the oil engines operating at average loads and for lower temperatures with the oil engines operating at full load. The heat saving effected by the economizing boiler results in a substantial increase in thermal efficiency of the locomotive.

An oil fired boiler has been installed in each unit which will operate in conjunction with the economizing boiler to supply steam for train heating during periods when the output of the latter does not meet the requirements. This boiler uses the same fuel oil as the engine and it has an evaporative capacity of 2500 lb. of steam per hour to 100 lb. pressure. It is controlled automatically to maintain a constant pressure in the train heating system with the varying rates of evaporation of the economizing boiler. The automatic operation is accomplished by a pressure controller, which operates to increase the supply of fuel oil, atomizing air or steam, and combustion air, if the pressure falls below normal due to a reduced output from the economizer, corresponding with a reduced load on the oil engine, and conversely to reduce the supply of fuel oil, atomizing air or steam, and combustion air, when the pressure increases above normal due to an increased supply of

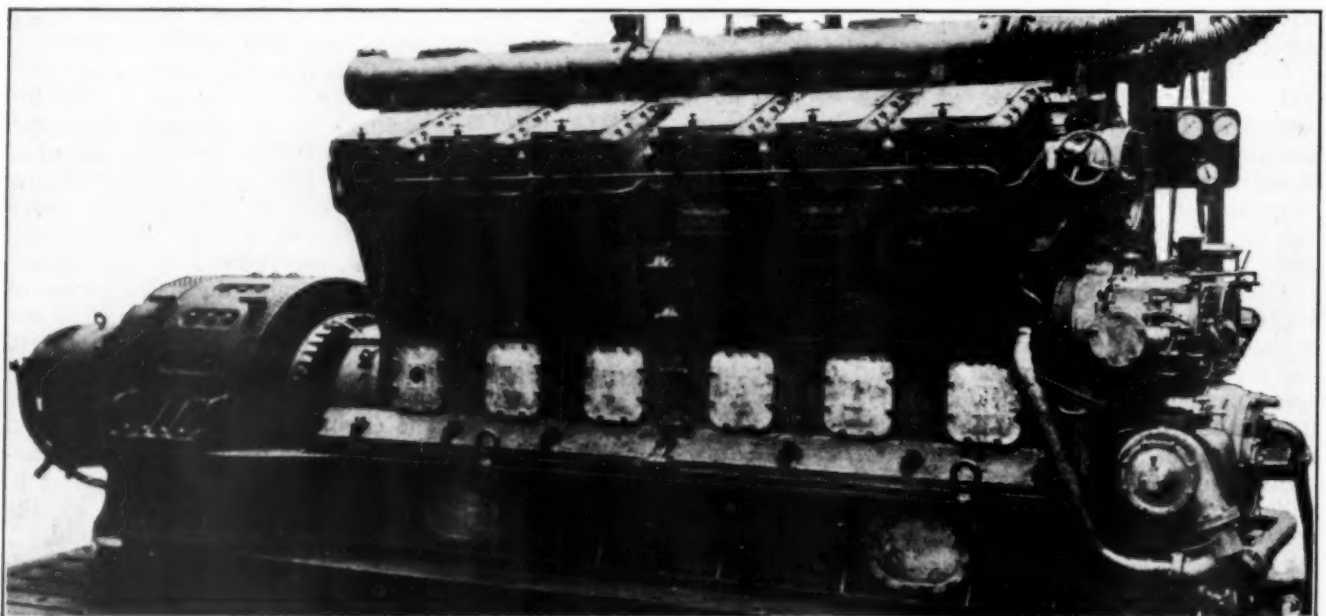
steam from the economizer, corresponding with the increased load on the oil engine.

Automatic control of water injection pumps for both economizer and oil fired boiler, is provided to maintain the water at constant level in both boilers during periods when the demand for steam requires full output of the former and partial or full output of the latter. When the demand for steam is less than the capacity of the economizer, the oil fired boiler may be made inoperative and the output from the economizer reduced by lowering its water level thereby reducing the evaporative rate. Under these conditions, the water level and consequently the evaporative rate of the economizer is controlled automatically by a pressure controller which operates to control the water injection pump. Under conditions where there is no demand for steam, the water level is reduced to zero and the economizer is operated dry as a silencer for the oil engine until such time as a demand for steam occurs, when water is injected into the economizer and it again functions as a boiler.

The economizer and boiler are of the thimble tube type, and were designed and furnished with the auxiliary steam control equipment by the Clarkson Steam Motors Company, Ltd., of London, England.

Electrical Control Apparatus

The electric generators, motors and auxiliary electrical equipment were designed for this particular service by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., and were supplied by the Canadian Westinghouse Company of Hamilton, Ontario. The system of control provides for varying the speed of the oil engine and generator voltage, and shunting the field of the series type traction motors for changing the speed of the locomotive. Torque governor control is used to insure continuous air supply and battery charging regardless of oil engine speed and to automatically prevent overloading of the oil engine by regulating the main generator field current, maintaining a practically constant torque over the operating range of voltage and current. Remote control of generator and motor switches and of speed setting of the engine governor permits the multiple operation of the two units



The Beardmore 12-Cylinder Engine Develops 1330 Horsepower at 800 r.p.m.

comprising the locomotive. Automatic reversal of radiator blowers occurs with reversal of the locomotive, to maintain the flow of the cooling air in such a direction that the blowers assist the natural flow of air due to the pressure developed by the direction of travel of the locomotive. Means are provided for stopping either or both oil engines from either engineman's station.

A motor-driven blower is installed in each cab to force ventilate the traction motors when conditions warrant in passenger service, and when in freight service.

A lead storage battery consisting of 56 cells of Exide M. V. A. 21, 340-ampere-hour capacity, is carried on each unit. This battery is installed principally for engine starting but it also furnishes power for control, lights, and auxiliaries during part time. It is charged from the main generator during engine idling periods and from the auxiliary generator during power periods.

Air Brake Equipment

The locomotive is equipped with Westinghouse type 14-E. L. air brake equipment, transfer valve, and brake valve pedestal. Each unit of the locomotive has a 75-foot motor driven air compressor which operates from the main generator during engine idling periods and from the auxiliary generator during power periods, thus insuring full speed under practically all operating conditions. Automatic means are provided to prevent application of power on reversal of locomotive with the driver brakes applied, to protect against sliding of wheels.

The foundation brake rigging, designed and supplied by the American Brake Company, St. Louis, Mo., represents the maximum in simplicity and flexibility for this type of chassis. Four driver brake cylinders are provided for each unit, two of which brake the two forward pair of drivers, while the other two brake the two rear pair of drivers. A fifth brake cylinder is provided for braking the four-wheel engine truck. A hand brake is also provided for holding the locomotive when stopped, in case the air brake is inoperative.

Mechanical Design

The main frame of each unit consists of a Commonwealth casting having supports for the oil engine bed-plate, boiler supporting casting, cab brackets, air duct, brake hangers and equalizer pins cast integral with the side frame and cross-ties. The four-wheel and two-wheel truck frames are also of the Commonwealth type. The driver journals and two-wheel truck journals are waste packed, oil lubricated. The four-wheel truck journals are of the outside bearing type, floating bushing, grease lubricated. The equalization system consists of one point of support at the centre pin of the four-wheel truck, and one point in the equalization system of each side, the drivers being side equalized with the two-wheel truck.

The mechanical design of the locomotive represents the result of the combined efforts of the Canadian National Railways, Canadian Locomotive Company, Baldwin Locomotive Works, Commonwealth Steel Company, and Westinghouse Electric & Manufacturing Company.

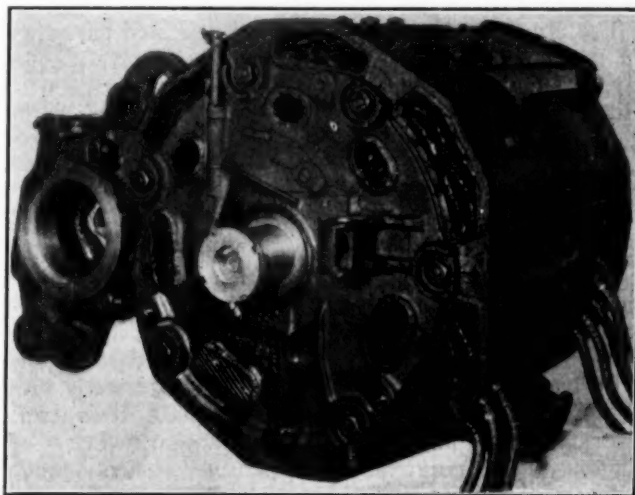
The cabs and running gear were built and assembled on the frame by the Canadian Locomotive Company and the locomotive was equipped by the same company under the supervision of the Canadian National Railways.

Each unit carries approximately 8,000 lb. of fuel oil, 11,000 lb. of boiler water, 3,000 lb. of engine jacket cooling water, 3,000 lb. of sand, and 1,000 lb. of engine lubricating oil.

Fuel for Twelve Hour Operation

The supply of fuel oil will be sufficient for operation of oil engine and oil-fired boiler, operating under average conditions, for twelve hours. A motor-driven pump is mounted on each unit for filling fuel oil tanks. An oil filling pipe is installed on the locomotive for filling either unit from a tank car at the end of the locomotive.

The supply of boiler water will be sufficient for heat-



One of the Four Westinghouse Motors Which is Used in Each Locomotive Unit

ing a train of average length for periods of from six to twelve hours, depending upon outside temperatures.

Expected Performance

The traction motors are geared for passenger service and will develop 100,000 lb. tractive effort with this gear ratio during accelerating periods. The locomotive will handle the heaviest passenger trains at a high schedule speed. With the present gear ratio in freight service, the tonnage which can be handled will depend upon the ruling grade and is limited by the heating of the electrical equipment.

Assuming a ruling grade of 0.4 per cent, it will handle trains of 2800 tons made up of 45-ton cars, under average weather conditions, at a speed of approximately 19 mph. on this grade, with a balancing speed of approximately 40 mph. on level track.

Assuming a freight gear ratio of 18:73, the locomotive will be capable of developing a maximum tractive effort of 130,000 lb. during accelerating periods with momentary tractive efforts limited by adhesion. It will handle a trailing load of 3700 tons, made up of 45-ton cars, under average weather conditions, on a ruling grade of 0.4 per cent at approximately 15 mph. and it will have a balancing speed of approximately 35 mph. on level track.

The oil engines of both units are arranged for the future application of a super charger, one of which has been built and tested on both engines. The super charger will be installed on one of the units for service tests in operation on the railway's lines.

Wabash Celebrated Ninetieth Birthday in November

THE Wabash celebrated its ninetieth birthday in November. The history of the road dates back to November 8, 1838, when the Northern Cross, a 12-mile line was placed in operation between Meredosia, Ill., and Morgan City. It was the first section of track laid in Illinois. In the light of modern invention it is interesting to note that so unreliable was Engine No. 1 on the Wabash, that it was put out of commission a few weeks after the road was opened to service because the engineer built too hot a fire under the boiler and melted the flues.

The Northern Cross railroad, authenticated parent of the present Wabash, was not born without travail. The suggestion that it be built with state funds met with protest from some of the most eminent men of the state and it is probable that if Governor Joseph Duncan had not been a man of vision, a rail project would not have been started in the state for many years.

The history of the Northern Cross really starts in 1834 when Governor Duncan, in his message to the legislature, referred to the fact that the state should immediately consider whether railroads or canals would be of more benefit to Illinois. He remarked, incidentally, that it appeared to him that canals were cheaper and more useful and in that connection he endorsed a project known as the Illinois-Michigan canal. It is interesting to note that his message said that, when well made, a canal requires less expensive repairs than a railroad, is continually improving and will last forever, while railroads are kept in repair at heavy expense and will last only about 15 years.

Despite the dubious status of the steam railroad, the legislature appointed a committee in 1834, to investigate both canals and railroads and it is interesting to note that this committee, after much serious thought, expressed the opinion that canals were preferable to railroads. "From all the information which the committee has been able to avail itself, it would seem that public judgment in the state and elsewhere has settled down in favor of canals in preference to railroads," read the report. "If we glance at the institutions and improvements of civilized man in every portion of the world, we are struck with the fact that in those countries and among those people where the means of promoting the welfare of the people are most profoundly understood, there canals abound and there the government has been most anxious to increase the facilities for internal commerce in their communication between different parts of the same country. Our neighbors, Ohio and Indiana, have profited by the wisdom and experience of other enlightened states and their citizens are now enjoying unlimited prosperity as the fruit of their sagacity and enterprise."

But despite this apparent unwillingness to accept railroads in place of canals, Governor Duncan was successful in forcing through a bill of appropriations for state roads, following which he and several associates secured a charter from the state to build a steam engine line from Meredosia to Morgan City.

On November 8, 1838, the first locomotive ran over the flat iron track of the Northern Cross. The run was made after a most ceremonious fiesta in which the actual operation of the engine was threatened because conviviality was so intense that the mechanics did not function with their normal vigor.

A part of an account of the inaugural which appeared in an early Illinois newspaper follows:

"When everything was ready to begin work, it naturally appeared that so important an enterprise should be inaugurated with some formal ceremony. The day for beginning arrived late in the autumn of 1837, and the sub-contractors took their men, accompanied by a large number of citizens, to the point whence the road was to start. The day was given up to speechmaking, jollification and hilarity.

"The work of grading went on all winter, and was finished in April. The track was laid by putting down a piece of square timber called a mudsill, on the top of which cross ties were laid. On these a wooden rail was laid, and flat bars were spiked on the top of the rail. These bars were 2½ in. wide and 1 in. thick. It is not distinctly remembered whether this iron was of foreign or domestic manufacture, but it was brought by way of New Orleans and St. Louis.

"The first locomotive that ever turned a wheel in the Mississippi Valley was brought in pieces and set up to operate this earliest Illinois railroad. It was made by Rogers, Grosvener & Ketchum, of Newark, N. J., and was landed from the steamer Quincy in the autumn of 1838, soon after the iron had been laid on the road. It was a curious little contrivance, and as compared with the more modern construction of locomotives, was a consummate piece of clumsiness. The driving wheels were about 2½ ft. in diameter.

"A man by the name of Fields came out with the engine to set it up, and on the day he got it on its feet, the jollification ran so high that he got off his, and had to be carried to the hotel for repairs. On the way he protested that they were heaping undeserved honor upon him, and begged to be treated as a man of no distinction or eminence. He was the first engineer on the road, and ran the little engine—which was called the Rogers—for about a month. Afterwards a man by the name of Higgins ran it; but he melted out some of the flues and at last was discharged for dissipation. Finally two young men by the name of Gregory were put in charge of it, and after a while they succeeded in running the engine off the track between New Berlin and Springfield."

The line was extended from Springfield to Jacksonville in 1841. The state operated the road until 1847 when the legislature passed an act authorizing the sale of the road between the Illinois river and Springfield. One of the peculiar provisions of the act was that it provided, for the first time in the history of railroads, a forty-year lien on the road to secure the amount for which it might be sold. The road was bought by Nicholas H. Ridgeley for \$21,000 and the name was changed to the Sangamon & Morgan railroad.

Shortly thereafter the Illinois legislature passed an act extending the charter of the road to the Indiana state line. The actual extension of the line from Springfield to the Illinois-Indiana state line was on a partially graded roadbed of the uncompleted project of the state.

THE POUGHKEEPSIE & WAPPINGER FALLS (Electric) Railway has been authorized by the New York Public Service Commission to discontinue the operation of trolley cars between Poughkeepsie, N. Y., and Wappinger Falls. At the same time it is announced that the railway company is to sell to Dutchess County, for state highway purposes, all of its rights of way between the towns named, for the sum of \$150,000.

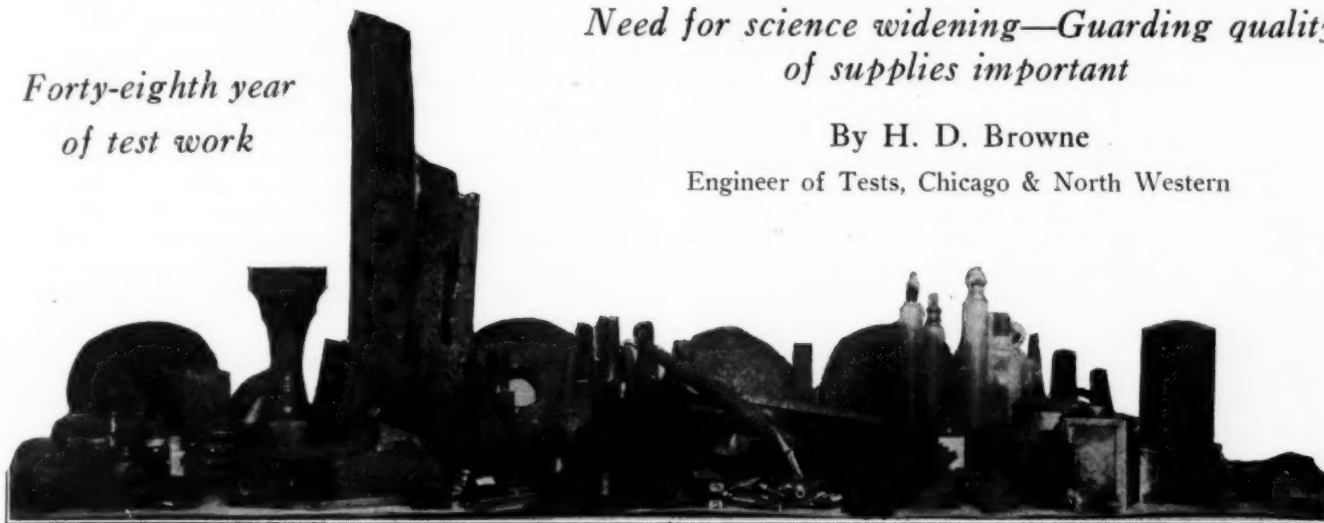
North Western a Pioneer in Research

*Forty-eighth year
of test work*

*Need for science widening—Guarding quality
of supplies important*

By H. D. Browne

Engineer of Tests, Chicago & North Western



Samples of Test Work of the North Western Laboratories

THE Chicago & North Western was the pioneer railroad of Chicago. It is also a fact, though perhaps not so widely known, that the North Western was the pioneer road in the Middle West to establish a department for testing materials,—both chemically and physically. The first step was the installation of a chemical laboratory in a corner of one of the buildings at the Chicago shops. Later the physical testing and inspection of materials were added to the duties of the infant department, the work was increased, the scope of activity broadened and a new building was erected in which a complete chemical and physical laboratory was installed. The laboratory was established under the direction of G. M. Davidson, with the title of chemist. Later the title was changed to chemist and engineer of tests to correspond with the augmented duties of the department. Mr. Davidson personally supervised the affairs of the testing department from April, 1886, until December, 1921, when he was promoted to industrial engineer.

A Co-ordinating Department

The testing department is now conducted under the direction of the engineer of tests, reporting to the individual engineer, who in turn reports to the president. It is essentially a co-ordinating department, working directly with other departments concerned in the use of a wide range of materials. A list of these departments follows, together with a condensed outline of the materials tested and inspected and the work done.

1. *Motive Power*—Boiler and firebox steel plates, forgings, structural steel, staybolt iron, wrought iron bars, engine bolt steel, wheels, boiler tubes, castings, springs, anti-friction bearings, etc.

2. *Car*—Structural steel, forgings, wheels, axles, couplers and knuckles, rubber hose, chain, fabricated parts, springs, journal bearings and packing, lumber, etc.

3. *Engineering*—Structural steel, track bolts, spikes, splice bars, and tie plates, rail anchors, nut locks, castings, cement, lenses, roundels, insulating fiber, bond wires, wood preserving chemicals, reinforcing steel, etc.

4. *Stores*—Materials shipped subject to inspection at destination such as illuminating, lubricating, gas and

cleaning oils, soda ash, caustic potash, oxalic acid, turpentine, lead, tin, antimony, phosphor bronze, aluminum, zinc, lining metal, fusees, torpedoes, leather belting, etc.

5. *Purchasing*—General co-operation in promptly inspecting and expediting shipments of materials, testing samples submitted by manufacturers, investigating manufacturing plants, and in preparing specifications on which purchases are based.

6. *Freight Claim*—Examination and analyses of various materials damaged or alleged to have been damaged in transit for which claims have been made by the shippers.

7. *General*—Serving all departments requiring technical information of a chemical or metallurgical nature.

Chemistry Vital to Transportation

It was formerly more or less of a mystery to the layman as to what possible use a railroad, engaged in the transportation of passengers and freight, could have for a chemical laboratory. As a matter of fact, however, the employment of chemistry plays a vital role in the successful conduct of transportation and the volume of chemical work performed is constantly expanding. Practically all of the important materials used by railroads are governed by chemical requirements as to composition, and, therefore, must be subjected to chemical analyses.

In addition to materials of construction, the materials used in connection with the operation of locomotives and cars are subject to chemical survey; this includes coal, fuel oil, lubricating oil, cleaning oil, packing waste, water, etc.

The chemical control of water supply represents a large amount of work, and requires not only field tests by a technically trained water supervisory force, but means also that several thousand analyses and tests of samples of water are sent to the laboratory each year. The problem of improving the drinking water supply is studied by making sanitary chemical analyses to determine the suitability for human consumption.

Reclamation of used crank case oil from motor cars and locomotives is one of the recent studies of the chemical laboratory, and the progress of this work so

far indicates that considerable economy can be effected. Analyses are made of various minerals found along the right-of-way to determine their composition and potential commercial values. Special investigations involving chemistry are carried on. Tests are being made to determine the relative corrosion-resisting properties of various materials. Cream, milk and other food products are examined. Disinfectants, deodorants, insecticides and cleaning compounds are developed, analyses are made of chemicals used for preserving wood, and also of wood that has been chemically treated.

Considerable chemical work is done in connection with samples of material sent in by the freight claim department to represent shipments alleged to have been damaged in transit and frequently it has been demonstrated that the railroad is not involved in any liability. Typical of the articles examined are lily bulbs, women's hosiery, base balls, grape juice, rugs, peanuts, bristles, eggs, potatoes, rice, pepper, hops, seeds, asphalt roofing, sheep skins and wheat.

Formulate Specifications

One of the necessary tasks of the department is the formulation of specifications to govern the purchase and testing of various kinds of materials used by the railroad in the construction and repair of locomotives, cars, bridges, etc. A specification may be defined as a concise statement of physical qualities and chemical composition required to render material suitable for the purpose indicated.

Specifications for materials, to be practicable and workable, must necessarily involve not only knowledge of conditions in the field of use, but also conditions of manufacture, which means that the testing department must function as a connecting link between the user and the manufacturer, and these two conditions must be correlated in drawing up specifications. Not many years ago, railroad materials were not purchased on specifications, and when this was first started, much opposition was encountered from manufacturers but it is now the general practice of the railroads to utilize specifications in connection with the purchase of materials.

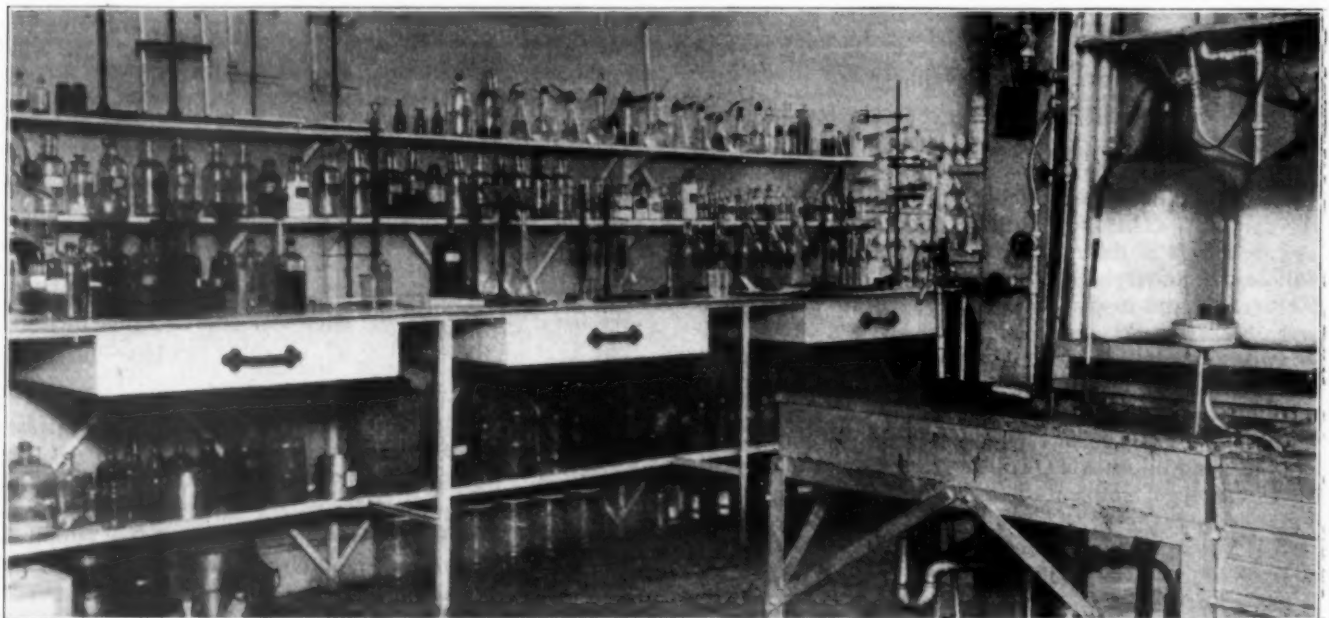
In the formulation of specifications, recognition must always be given to the value of collective thought, and

the department has since 1900 been represented in the American Society for Testing Materials, a society composed of technical representatives of both producers and consumers of material. The department is also represented on the Committee on Specifications and Tests for Materials of the American Railway Association, this committee consisting entirely of railroad officers,—mainly engineers of tests. The testing department is also represented on committees of the American Railway Engineering Association; the American Wood Preservers' Association and the American Water Works Association. Where the specifications that have been issued by the different associations are suitable, they have been adopted; where special conditions must be met, special specifications with the aid of the testing department are proposed.

Inspect Purchased Materials

Every effort is made to improve the quality of materials through a study of manufacturing methods, the application of proper specifications and careful attention to testing and inspection. The greater part of the materials covered by specifications are tested and inspected at the points of manufacture, prior to shipment. This work is performed by a corps of trained inspectors who, in addition to carrying out their inspection duties, are required to familiarize themselves with the different processes of manufacture used at different plants.

The inspector, upon arriving at a manufacturer's plant, first ascertains what material is ready for inspection, then identifies it by heats or other testing groups. Where the specification prescribes tests, the required number of specimens are selected by the inspector and tested to determine if the physical properties conform to those specified. This is followed by a surface inspection to see whether there are defects that can be seen by visual examination. Any material found defective or which does not comply with test requirements is rejected and so reported. In certain cases drillings are taken by the inspector and sent to the laboratory for check analyses. Each plate of boiler or firebox steel is identified by a serial number furnished by the railroad, as well as the manufacturer's heat number. This



In the Chemical Laboratory of the Test Department

practice is also followed in connection with other important materials and forms a basis for keeping a record showing the chemical and metallurgical history of each piece of material.

In some cases, such as cast iron and steel wheels and other materials, the manufacturer casts an individual serial number on each piece. Wherever it is practicable, the inspector is required to stamp each piece of accepted material with the railroad's acceptance stamp. The action of the inspector in accepting or rejecting material is confirmed by formal written advice to the manufacturer from the office of the engineer of tests. Copies are forwarded to the general purchasing agent, the general storekeeper, and all others who are interested in the material.

Some of the materials used by the railroad are sampled and tested after reaching destination. These, in the main, are materials of such a nature that they cannot be positively identified if inspected at the manufacturers' works prior to shipment.

Study Failures in Service

All railroads are vitally concerned with the service performance of rails, which are often taken out of tracks for various causes other than wear. It is part of the work of the testing department to study such failures. Failed rails are assembled at the Chicago shops and once each year joint inspections are made of these rails with representatives of the manufacturers for the purpose of determining whether the failures were due to mill defects that could not be detected when the rails were new. Investigations are also made of other materials that fail to render satisfactory service, with a view of determining the causes of failures and to provide the remedies.

The greater part of the North Western's coal supply is obtained from the company's mines in Macoupin county, Illinois. Inspection is carried on at the mines as well as at coal chutes and on locomotives.

The inspection and testing of locomotive fuel oil, which is largely used on the lines west of the Missouri river on account of its lower cost, is very important and occupies the entire time of a fuel oil inspector who is stationed in the field from which the supply is derived. This fuel inspector is required to test all oil purchased to determine if it is strictly in accordance with the specification; to make corrections for changes in volume due to loading temperatures, and to make deductions for impurities and other reasons.

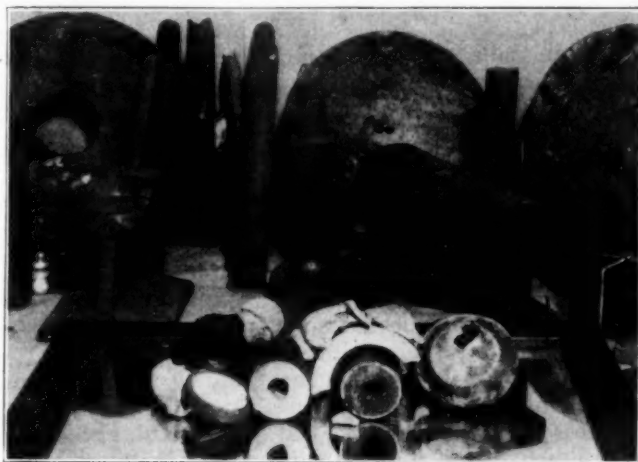
Scope of Work Broad

The activities of the department extend over a very much wider field than that occupied by inspection work alone or to the problems of any single department. One of the largest and most active branches of the outside work is the treatment of water for locomotive boilers. Many wayside water softening plants have been installed for which chemical formulas are furnished and over which technical supervision is exercised to provide assurance that the water is properly treated in order to remove scale-forming matter. The chemical formulas used for softening waters must be adjusted from time to time to meet varying water conditions. Samples of the softened water are sent in regularly from each plant to the chemical laboratory for analysis. Formulas are developed for boiler compounds to prevent scaling in locomotive boilers in districts where the amount of water consumed is insufficient to justify the installation of wayside plants, and also formulas for compounds to

prevent boilers from foaming. This work has produced gratifying results in improved boiler conditions, few engine failures due to boiler troubles, and a considerable reduction in the amount of work required to keep boilers in condition.

Co-operative Investigation Work

Investigative work in co-operation with the motive power and car departments has aided in adopting the use of new materials. For instance, it formerly was the



Boiler Scale in Foreground Eliminated by Chemical Methods

practice to use wrought iron for engine bolts, but in recent studies, it has been demonstrated that certain alloy steels have considerably higher physical properties and they are now used extensively on the road. Further investigations of alloy materials are in progress. In addition to this, various kinds of formulas are developed by research to govern the manufacture of materials, examples of which are this road's formulas for manufacturing brass and bronze castings and for heat-treating steel.

From the specialized nature of much of the work and the conditions under which it is done, the work of this department has not always been obvious, but many of the steps taken to bring about economies of operation on the road have a background in the work of its testing department.

* * *



On the Maine Central at Brunswick, Me.

Whither Are the Railroads Drifting?

Now facing competition from airway, auto truck and waterway—These forms of transportation must be properly co-ordinated

By F. J. Lisman

F. J. Lisman & Company

THE railroads have some very serious problems which have nothing to do with the Interstate Commerce Commission and they need leadership to cope with them.

Passenger earnings have declined about one-third during the last eight years. Possibly the railroads might have held much of their local passenger business; at any rate they could have greatly reduced their operating expenses if they had promptly put motor car service on their branch lines at a cost of from 25 to 40 cents per train-mile as against a cost of not less than 90 cents per train-mile with steam trains.

In many cases they might have anticipated the competition of independent bus lines by going into the bus business on their own account. It would have been very much easier for the companies to have obtained permission to abandon passenger service if they had agreed to substitute bus service on a satisfactory schedule. During the past few years many railroads have gone into the bus business and others are following, but many rather too slowly. In some states the bus field is so thoroughly occupied that the required permission can no longer be obtained from the state authorities.

Competition By Air

There is looming in the not far distant future the probability of loss of a very substantial percentage of long haul passenger business to the aeroplane. While aeroplanes will undoubtedly create much new traffic, they will certainly cut into the existing long haul business.

The cost of operating by air is being reduced steadily. Fairly large sized aeroplanes can be operated at present, if fully loaded in both directions, at probably about 7 cents per passenger-mile. How fast and how far these costs may be reduced is difficult to foretell but they are certain to be cut considerably. At present the cost of insurance and depreciation is approximately one-third of their total operating expenses. Surely this item will be greatly reduced.

There are only two sections of the country where the present status of air-navigation is still somewhat uncertain on account of frequent dense fogs. This refers to the crossing of the Allegheny mountains in the east and the Coast Range in the northwest. Nevertheless there will soon be air competition for heavy passenger traffic between cities on the Atlantic seaboard and points like Chicago, St. Louis, etc.

In order to meet such competition, the railroads will have to accelerate their passenger service. The 18-hour fast trains between New York and Chicago (the predecessors of the present 20-hour Broadway and Century trains) which were operated sometime previous to the war were really too fast for the condition of the roadbed and general state of the art at that time. Since then the automatic train stop has eliminated the danger of rear-end collisions. The progress of chem-

istry has improved the quality of the rails and other scientific appliances enable the discovery of any defect in the rail structure. The average weight of the rails has been increased by fully thirty pounds per yard. There is much additional third and fourth track. Locomotives and cars have also been greatly improved and strengthened. All seems to justify faster schedules which may enable the railroad companies, not only to hold their share of business against competition by air, but also to meet some of the bus competition. The Boston & Maine has demonstrated the fact that with faster schedule of local trains, local traffic can be regained from the buses to a considerable extent.

The railroads should hold the bulk of their through business if they will increase the running time of their trains to about 60 miles per hour. This will enable passengers to make the run between the principal cities of the east and Chicago, St. Louis, etc., and between San Francisco and Portland, between the closing of business one day and the opening of the next. It would mean a four-hour trip from New York to Washington or Boston, and a five-hour trip between Chicago and Cincinnati or Louisville and St. Louis, etc. The huge traffic on many extra fare trains proves that the public is willing to pay a substantial bonus for fast service which saves "business" time. Taking into consideration the loss of time to and from airports, there would be no advantage in traveling by air, distances up to 300 miles.

Auto Truck Competition

Auto trucks have been cutting very deeply into the less than carload traffic within a 50-mile radius of the big cities. In a number of cases the railroads themselves have abandoned the local freight trains and are handling this traffic by trucks. However, railroad men are so set in their habits and so afraid of new problems, that even when handling LCL tonnage by motor truck, they insist on picking it up at their present freight stations and delivering it to the antediluvian freight stations at local points. In most cases it would be just as easy for the trucks to deliver the freight across the way from the freight stations, or two blocks away to the ultimate consignee, rather than compel him to send for his freight which involves a loss of time and expense. The railroads are talking very much about "service" but they are surely not bringing it to the door of the shipper, while the truck is doing that very thing. It is but human for the merchant to be resentful when he sees a truck loaded with his goods pass his door on the way to the freight station and has to pay extra to get them back. It inclines him to give preference to the trucking company.

The railroads are in excellent position to compete with trucks if they will face the situation and promptly modernize their plants, getting the maximum result at the least cost out of the combination of long haul by rail plus short haul service by truck. They thus will

be able to utilize their facilities to the fullest advantage.

The motor truck business is still in its infancy. Not only are there many competing lines operating out of the various cities, but many retail merchants maintain their own delivery system, in adjacent communities sending out trucks partially loaded and bringing them back empty. Sooner or later, the question of most efficient operation will have to be worked out; this will mean tonnage as near capacity in both directions as possible. The railroads with their large volume of traffic originating all over the country are surely in a better position to organize and handle this than individual trucking firms. If the railroads do not act promptly, the trucking companies will get together and coordinate; they will then handle substantially all less than car load freight to practically all local points reached by good roads. Perhaps 10 years hence the railroads will buy them out at a high price.

Store Door Delivery

Store door delivery is coming, not only in the villages but everywhere. Even though it does bring new problems it must come because it is more economical and efficient than the present method and it means a service for which people are willing to pay. It will mean a reduction in the cost of terminals and in many cases prompter movement of cars. If the additional cost of trucking is fixed on the basis of actual minimum cost instead of an endeavor to get competitive business, then store door delivery will mean an annual increase in revenue.

In a report on Motor Bus and Truck Operation, the Interstate Commerce Commission said: "Store door delivery is today receiving the earnest consideration of railroad executives and shippers' representatives, as well as ours. Store door delivery would mean quicker and better service to the shipper with a great saving of time, elimination of terminal congestion, consolidation of freight into fewer cars, and reduction in use of stations and cars for storage."

The railroad executives in New York have given the matter "earnest consideration" but the result of that consideration has been that they do not want to see the service established. It may be due, as their witnesses have stated, to a fear that the service, if established, would be at or so near to the level of the New York rates, as to cast an unfair cartage burden on the carriers.

In Detroit, at a recent meeting of railroad officials interested in the subject of motor transport, there was again the academic discussion showing much interest, or even aim, but nobody seemed quite ready to shoot.

In Examiner Ames' report on the "New York Terminal Situation" issued a few days ago, there is the following statement:

"The present attitude of the carriers is the outgrowth of a nasty competitive situation which has gotten beyond their control, and not because they feel that trucking service, if properly regulated and policed, is not desirable. It is humanly impossible to have sat through this hearing and through the hearing on a similar question at St. Louis, listening to the unfolding of the terminal problems of those two great shipping centers, without becoming deeply impressed with the tremendous advantages to be gained by carriers and shippers in a proper system of truck coordination. At St. Louis some of the very carriers which desire to restrict the service at New York, are active supporters of a plan similar to that which the New York shippers

seek to have installed. Thus we have the anomalous situation of three great railroad systems upholding and condemning similar services at opposite ends of their lines."

The last sentence of this statement is particularly interesting in proving the lack of vision of some railroad officials. The examiner, in his report on the complex New York terminal situation, suggests that the Commission ask Congress for legislation giving it authority to deal with questions affecting terminal service by means of motor trucks, etc.

In connection with more economic and efficient handling of LCL traffic, the "container" is developing rapidly because it serves a useful purpose. The properly designed "container" is a permanent damage and theft proof case moving on its own wheels. It is easily handled at minimum cost from factory, via truck and railroad car to its destination which might be on the top floor of some building located on or off the railroad. It does away with the necessity of expensive wrapping and casing of a great variety of goods. If energetically coordinated and supported by the railways, it will bring back to them much traffic now moving long distances by truck.

Waterway Competition

The most profitable business—if not the only profitable business—the railroads have is the long haul freight traffic. This is also menaced in the most dangerous and insidious way by the advance of waterways. Waterway transportation may be economical on freight which originates and terminates at the waterfront, but this necessarily applies to a small fraction of the entire traffic.

The public looks at the rivers and thinks they are "God made free waterways". An infinitesimal fraction of the people realizes the cost of making such waterway an economical means of transportation. Nearly every river is full of shoals and all kinds of obstructions to safe navigation. Most rivers have rapids which, even if ever so slight, interfere with navigation. During certain seasons the water may be extremely low in different sections. Terminals must be adjustable to high and low water. The extremes of high and low water must be modified by the construction of reservoirs. The average seasonal difference on the Ohio river between high and low water is fully 30 feet. On the Lower-Mississippi the average is somewhat less. The mere statement of these facts visualizes the problems.

Our rivers and canals represent a huge expenditure of money extending over 100 years. There is involved dredging, the blasting away of obstructions, building of cutoffs, erection of dams and locks, regulation of side streams, protecting and widening the river banks and many other technical engineering problems.

In transportation by water—that is by water other than the oceans or the Great Lakes—the heaviest expense is the equivalent of the construction of roadway and its maintenance. The cost of construction of the average canal, or the cost of deepening and regulating rivers—that is cost of locks, dams, dredging, etc.—is generally much greater per mile than the cost of constructing railroads. The Erie Canal has cost approximately one million dollars a mile. In order to secure nine feet of water in the Ohio river between Pittsburgh and Cairo, there were required 52 dams, each with a lock 100 ft. by 600 ft. The enormous cost of all these works, including costly terminals and the heavy annual maintenance expenses, has been and is being paid by the taxpayers.

Farm aid is much discussed but it seems to consist largely in doing things for the farmer with his own money. There is much talk about reducing the cost of transportation for the farmers' products, but statistics show that the farmers' dollar of 1928 buys as much transportation as the same dollar did in 1913 but it does not pay as much taxes. Measured in purchasing power of the farmers' money, taxes have increased over 50 per cent and they are ever on the increase. The trite saying still applies: "To buy votes with one's own money is a crime and gets one into the penitentiary; to buy votes with the voters' money is meritorious and gets one a political job." Surely these remarks seem to apply to construction of waterways.

President Alfred of the Pere Marquette, who made a study of navigation on the Ohio river, presented the results of his study before a meeting of the American Society of Civil Engineers held in Cincinnati some years ago. He conclusively showed that moving a ton of freight one mile on the Ohio river, after allowing for interest at only 4 per cent, and a very nominal amount for depreciation and taxes, cost 1.29 cents. The average ton-mile rate on the railroads at present is about 1.08 cents. However, the bulk of commodities moved on the rivers consists of such heavy tonnage as coal, sand, gravel and stone, the ton-mile rate for which on the railroad is about eight-tenths of a cent. Furthermore the average distance by water between given points is greater than that by rail. For example, between Pittsburgh and Cairo the distance by rail is 670 miles and 968 miles by water. Therefore equating the ton-mile rate to distance, shipping by water really costs over twice the rail cost. However, the cost of making our rivers and canals navigable for heavy tonnage is hidden from the people.

Most newspapers and politicians keep talking about the low cost of transportation by water, of the desirability of depressing railroad rates by water competition, etc. This has become a fetish in the United States and the public now actually believes that waterways are desirable and economical. Of course this is not true as has been proven hundreds of times. In most cases it would be cheaper for the state to pay, out of its treasury, the railroad freight on the amount of traffic which now passes through the canals, than to maintain these canals. Nevertheless, Congress, reflecting the accelerated opinions and wishes of the people, is going to legislate in favor of waterways. President-elect Hoover is supposed to be a strong waterways advocate. Additional appropriations for water competition seem certain at this time and it will probably take a very

long time to convince the people and Congress of the wastefulness of these expenditures.

Barge Line a Steady Loser

The Tombigbee-Mississippi River Barge Line has been a steady loser but despite this Congress doubled the appropriation for it. Congressmen and the people, when they think at all, seem to believe that somehow the railroads can take care of themselves; that competition will not hurt them and in some way will be beneficial to the people.

Naturally the shippers and chambers of commerce immediately adjacent to the waterways are very busy pushing their own interests at the cost of the people at large. In fact, some of the shippers are now advocating reduction of rates through the Panama Canal. It is again a case of organized self-interest putting something over by aggressive propaganda, while the real facts are never properly presented to the public.

President Downs of the Illinois Central, in a recent speech in Chicago, put the case succinctly when he appealed to a body of shippers to treat the railroads fairly because if they failed to do so they would themselves be bound in the long run to suffer from reduced transportation facilities. Hamstringing the railways, in the end, means the hamstringing of shipping facilities with consequent losses to the shippers, be they merchants or farmers.

The railways as a whole have, on the average, failed by fully one percent or by about 225 million dollars a year to earn the permitted $5\frac{3}{4}$ per cent "fair return" on a low valuation of their properties. Further competition subsidized by the taxpayers is bound to hurt railroad credit and to check the expansion of their facilities.

Congress and the various states can hardly expect the public to furnish additional capital to enable the railroads to increase their facilities while subsidizing competition out of the taxpayers' money!

Some waterways are economical, for example, the Great Lakes. The railroads had coordinated Great Lakes traffic by operating their own connecting lake steamship lines. Congress interfered with this; it is now realized that this action was a mistake. What Congress and forward looking railroad officials should do is to concentrate on the problem of coordinating all methods of transportation—rail, water, bus, auto truck and air, for the purpose of giving the maximum service, free of government subsidy or favor to any type of transport or class of shippers, and at the minimum cost commensurate with a fair return on capital.

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A Passenger Train on the Monon at Chicago

Flashing-Light Crossing Signals Save Money for Wabash

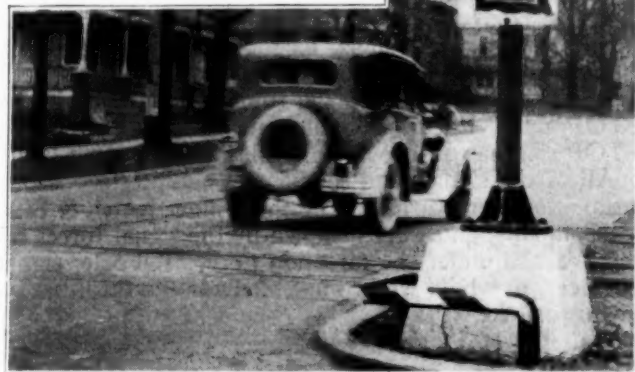
Twenty-four hour protection afforded at thirteen crossings in Wabash, Ind., including unique combination of automatic and manual control

THE Wabash has recently placed in service, flashing-light highway crossing signals at 13 street crossings in Wabash, Ind., which replace gates and flagmen at 9 of the streets, and flagmen at 2 streets while protection is now given at 2 streets where none was provided before. The pay roll saving for the eleven gatemen and flagmen relieved is about \$7,800 a year, which will pay for the new installation in about two and one-half years. Wabash is a town of about 10,000 population, located on the main-line of the Wabash between St. Louis, Mo., and Detroit, Mich. The traffic includes 8 passenger and about 12 scheduled freight trains daily in addition to a local and about 2 extra freight trains each way per day, making a total of about 26 train movements daily in addition to switching. All passenger trains make the station stop and their speed is, therefore, restricted, while through freight trains operate at not to exceed 20 miles per hour within city limits.

City Hearing After Study

After a study was made of the advantages to be gained by a change in the crossing protection, the division superintendent asked for a hearing before the city council and city engineer, at which time it was explained that the gates were in service only 12 hr. each day, whereas the flashing-light signals would give protection for the full 24 hr. Likewise, the gates, being manually operated, depended on the human element, whereas the signals would be controlled automatically.

Because of several small industries, warehouses and grain elevators in Wabash, the two daily local freight trains each spend about two hours switching. It was the opinion that with automatic control only, the signals would indicate "stop" for such long periods while the local trains were switching, that the automobile drivers would soon come to disregard the signals. A combination control was, therefore, arranged so that the signals are normally controlled automatically by the track circuits, but during the time the local freight trains are switching, the signals at the eight crossings in the switching area are controlled manually by the signal maintainers' helper in an elevated tower, which is so located that he can see the crossings involved. It was also agreed that, in addition to the standard Signal Section, A. R. A., alternate flashing-light signal, the Wabash should provide a vertical sign between the flashing lights, which would be illuminated during the operation of the signal to read STOP. Having agreed to fulfill these requirements, the railroad proceeded with the installation, the city engineer co-operating by locating the signals with reference to curb lines, etc. The signals were placed in service on November 2, 1928, and



The Protection Includes the Signal Section, A. R. A. Standard Flashing Lights and an Illuminated "Stop" Sign.

the city authorities have given their official approval of the installation and of the protection afforded.

The Control Is Combined Automatic and Manual

The track circuits of the automatic block signals in this territory were cut with insulated joints at each street crossing. The automatic control of each flashing-light crossing signal is so arranged that the signal starts to operate when a train approaches within about 2,000 ft. of the signal and continues to operate until the rear of the train passes. The lights of the signal flash alternately 30 times each minute, and the STOP sign is illuminated continuously while the signal is in operation.

The working schedule for the signal maintainer's helper is so arranged that he will be in town when the local freight trains are due, and upon arrival he consults with the train crew to get a general idea of the switching to be done. He then climbs to the control tower, where he throws a switch on the control board, which cuts out the automatic control of the flashing signals at eight of the crossings. He then watches the switching movements and when the locomotive or a cut of cars approaches a crossing, he throws the individual switch for that crossing, which operates the signal as long as he leaves the switch closed. When the train departs from town, he opens all of the individual switches and closes the main switch, which returns the control to the track circuits.

In the flashing-light units each lamp is mounted in a bracket fixture at the focal point of a concave mirror reflector of the Mangin type. A special red cover glass about four inches deep is used. The combination of the reflector and the special cover glass provide not only a long range indication, but also a close range indication of 180 deg.

The lamp in each of the stop sign light units is socket mounted with the filament at the focal point of an el-

liptical concave mirror reflector of the Mangin type, but of a different contour from that of the reflectors in the flashing units. The letters S-T-O-P are cut out in heavy fiber and mounted by clips in the door. The red cover glasses for the sign are $8\frac{3}{4}$ in. in diameter, of the convex type, which fills out the letter when illuminated, so that the sign is legible to a driver of a car approaching at a distance as well as up to the time he is near the signal.

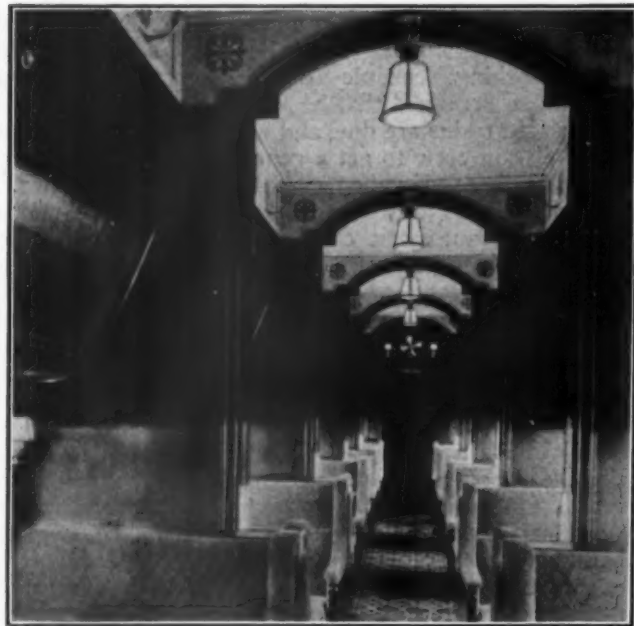
The Power Supply for Operation

At each flasher-light signal location, a five-cell Exide KXHS storage battery is provided for the operation of the flashing-light signal and for the line control circuits originating at that point. These batteries are charged by electronic rectifiers on the a-c. floating system. A 110-volt alternating current line extends each direction from a panel located in the station. The local transformer at each signal location has two separately wound secondaries, one for 10 volts to operate the rectifier and the other to feed the four 10-volt lights in the STOP sign. Each flashlight unit and each unit of the STOP sign has an 18-watt, 10-volt single-filament lamp.

All of the signals and the control equipment for this installation were furnished by the Union Switch & Signal Company, and were installed by the signal forces of the Wabash under the direction of W. J. Foale, signal engineer, to whom we are indebted for the information in this article.

New Equipment for the Twentieth Century Limited

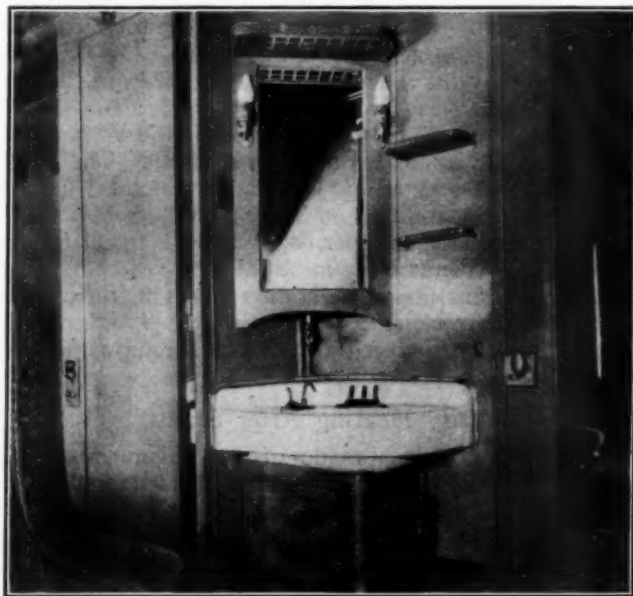
A SERIES of specially arranged Pullman cars for the Twentieth Century Limited are being put into service by the New York Central. The cars are of three types: A car containing six compartments and three drawing rooms; a car containing eight berth sections, two compartments and a drawing room, and an observation-parlor car with



One of the New Section Sleeping Cars Equipped with Attractive Side and Ceiling Lights

three compartments and two drawing rooms. While not exclusively made up of them, each section of the "Century" now includes some of the new cars.

The cars contain several New York Central innovations in their refinements for the comfort of the passengers. The six-compartment cars have connecting doors, so that a suite of four rooms can be provided. Each passenger has a wardrobe in which hats and wraps may be stored out of the way. There is also a medicine closet with shaving lights on each side of the mirror over the washstand. Individual steam valves permit the passenger to regulate the room temperature by operating the valve handle located beside the seat. Instead of the standard berth light in a socket, an attractive reading lamp with a mica shade is attached to the wall at a location most suitable for comfort. The brass window frames are equipped with sash ventilators. The upholstery is a small figured design in Nile green on an old rose background. New style paper cups are supplied, instead of the familiar envelope type, in a rack beside the drinking fountain.



The Lavatory of the New Six-Compartment-Three-Drawing-Room Pullman Car for the New York Central

Divided vestibule doors, cut in half so that the upper part can be thrown wide open for ventilation, while the lower half assures safety, are an innovation that will be appreciated in hot weather.

The berth section sleeping cars, are upholstered in handsome designs of cheerful colors and have an entirely new lighting arrangement. Instead of the customary dome lights, a light enclosed in a mica shade of ornamental design, different in each car, is suspended from the center of each arch between the sections. The lights emphasize the effect in perspective, of a vaulted passageway as one looks down the aisle. The berth lights are similar to those in the compartment cars.

ONE HUNDRED THOUSAND DOLLARS was awarded by a jury in the New York Supreme Court at White Plains, N. Y., on November 27, to W. K. Craft of Port Chester, N. Y., in his suit against the New York, New Haven & Hartford for damages sustained while he was serving as a brakeman at Holyoke, Mass., in August, 1927. He fell to the ground, when a grab-iron on a freight car gave way, and his spine was injured. The trial occupied 11 days.

Freight Car Truck Action in Curves

Early work of Wellington is illuminating in its relation to recent tests—Suggestions for further research

By T. H. Symington

RAILROAD research has sometimes lacked the stamp of authority and often the results have not become generally known. We practical railroad men frequently struggle with mechanical problems that were partially solved many years ago, and, therefore, much of our effort is often a duplication and unnecessary.

Data From Early Experiments

"The Economics of Railway Location," by A. M. Wellington, published in 1887, contains a chapter on "Mechanics of Curve Resistance" that states many overlooked facts. These facts are as true today with 55 and 70-ton cars as they were forty years ago with 20-ton cars. They are as follows:

- 1—The larger part of curving resistance results from essential wheel slippage, whether car wheels are coned or cylindrical.
- 2—In curving, a four-wheel truck always pivots around one rear wheel contact on the rail and the other three wheels slide on the rails, whether the curve is of one degree or thirty degrees.
- 3—The force to slide three wheels of any four-wheel truck in any curve always comes entirely from the outside front wheel flange.
- 4—This outside front wheel flange pressure to pivot the truck on one rear wheel is the same on a one degree curve or a thirty degree curve, if the rail is uniformly dry. The three wheels slide farther on a thirty degree curve than on a one degree curve, and thereby absorb more work and require more drawbar pull.
- 5—The rear axle always runs radial and the front outside wheel flange is always back of its radial position and contacts with the rail.

What Happens in a Curve

When a car is entering a curve, the leading truck is swiveled against the car body, and all clearances between the truck frames and the truck bolster are taken up in one direction.

The wheel slippage of any truck, as long as it is in a curve, is continuous, and the swiveling movement of the leading truck bolster is also continuous until the car is fully in a curve. When entering a curve, therefore, the outside forward wheel flange of the leading truck must exert enough pressure on the outside rail to overcome simultaneously the wheel slippage friction and the swiveling friction.

The rear truck of a car entering a curve has all clearances between the truck frames and the truck bolster taken up in the opposite direction, as the force for swiveling the rear truck comes from the leading end of the car, and adds slightly to the pressure on the outside front flange of the leading truck. Swiveling, therefore, occurs on the rear truck separately and independently of its essential wheel slippage, so that the maximum flange pressure to cause derailment of the rear truck in entering a curve is never greater than that necessary to overcome the wheel-slippage friction with, of course, the flange friction.

While the swiveling friction of the rear truck does not add to flange pressure and derailing tendency, all swiveling friction absorbs work and increases train resistance.

Analysis of Frictional Reactions

It is a simple matter similarly to analyze the frictional re-actions for each truck when a car is leaving a curve.

Cars do not often derail when fully in a curve, because there is then no warp in the track and rarely any car roll, either of which may reduce the weight on the outside rail and cause a derailment, particularly on a worn rail.

When a car is in a curve and the weight on either truck on the outside rail is sufficiently reduced by track warp or car roll (with A. R. A. standard rigid body cars it may be only 15 per cent on the outside rail and 85 per cent on the inside rail), the front outside wheel flange of the truck will climb before it can overcome the essential wheel-slippage friction of the rear truck, or the wheel-slippage friction plus the track-swiveling friction of the forward truck.

Wellington clearly shows that the flange friction, which accompanies wheel slippage in a curve and which is a factor in derailments, is largely increased on a worn rail and is at a minimum when a small radius corner of the rail is the only rail contact in the throat of the wheel flange.

The Findings at Baltimore

The results of the research on the action of freight car trucks in curves conducted at Baltimore, Md., early in October were set forth in an article in the *Railway Age* for October 27. The findings may be summarized as follows:

- 1—On warped track with the outside rail elevating, it is always the outside front wheel of the rear truck that derails, because the weight on this wheel is then not sufficient to permit its flange to overcome the wheel slippage friction before climbing.
- 2—On warped track with the outside rail depressing, it is always the outside front wheel of the leading truck that derails, because the weight on this wheel is then not sufficient to permit its flange to overcome the wheel slippage friction and the swiveling friction before climbing.
- 3—When the leading truck derails there is, as a rule, less track warp, and, therefore, less unloading of the outside rail, than when the rear truck derails, which may be partially accounted for because the flange pressure is greater on the leading truck.
- 4—Safety on warped curves is increased as side-bearing clearance is increased, because a very limited cross equalization of weight is thereby obtained. It is unfortunate that increased side-bearing clearance increases the tendency for cars to roll on tangent track.
- 5—The standard trucks could be made flexible or very rigid at will, and there was apparently no difference in the derailing tendency, whether rigid or flexible.
- 6—The Barber lateral motion when applied apparently caused no change in the derailing tendency.

No main-line track today is maintained with too much warp on an elevating outside rail, so long as this rail is not excessively worn. Dangerous warps occur with the outside rail depressed and are usually caused by acts of God, such as washouts, soft spots, pumping joints, or unevenly thawed out roadbed.

Attention is drawn to the fact that a rigid-body car with no side-bearing clearance derailed on an unworn sanded rail at very slow speed on a washout 1-9/32 in. deep, with no lateral pressure from car roll or centrifugal force. It has been noted that cars will run safely through a curve at fair speed when they will derail in the same curve at very slow speed. The reason for this would seem to be that at fair speed any sliding coefficient of friction is much less than it is at very slow speed, and, therefore, the flange pressure which causes derailments is lower at fair speed than at very slow speed.

Increasing the Derailment Factor of Safety

There are four things that suggest themselves to increase the derailing factor of safety.

First—If the run off to obtain super-elevation is largely confined to tangent track and minimized on approach curves, the derailing factor of safety is increased because, with less warp in the curved track, there will be less unloading of the wheels on the outside rail on the approach curve, where high flange pressures always exist. Where it is impossible to confine the run off largely to tangent track, for example, on sharp, reverse curves, a suitably placed guard rail on the inside rail will prevent all such derailments, because although the outside front wheel flange may climb to the top of the outside rail, it cannot drop off.

Second—If the outside rail on a curve is canted inward until the gage surface is at a high right angle with the cross ties, the derailing factor of safety is slightly increased particularly when the rail is worn, because the wheel flange can then exert more pressure against the rail before climbing.

Third—If all wheel flanges are oiled on approach curves with track oilers, the derailing factor of safety is somewhat increased, because oiled flanges can exert more pressure against the rail before they will climb.

Fourth—If freight car trucks are cross equalized so that there is always about 30 per cent of the weight on each truck on the outside rail, they will never derail from flange pressure, regardless of the condition of the track, because high flange pressure cannot cause a wheel to climb if there is sufficient weight on it. This cross equalization will also permit small side-bearing clearance, which minimizes car roll and is equally effective on tangents to prevent derailments that now occasionally result from car roll taking the weight off one rail or the other.

Laboratory Results of Little Value

Laboratory results are of little value to railroad operating men, except as they may correctly indicate and establish general mechanical principles. The truck-swiveling tests at Baltimore definitely indicated that the expense of periodically lubricating center plates is unnecessary. Grease quickly disappears and graphite apparently does not reduce the swiveling friction. Finished center-plate surfaces soon polish after being once greased, and, thereafter, offer no important resistance to swiveling.

Truck bolsters can be bought today with the center plates machined at small, if any, extra expense. Cast steel body center plates can be cheaply faced off. This

operation would hardly seem necessary on drop-forged body center plates.

The very high swiveling resistances encountered at Baltimore with plain side bearings and warped track may be partially accounted for because these side bearings had not worn down into smooth contact with each other and there was probably an interlocking of surfaces.

Further Study of Truck Swiveling Friction

As truck swiveling friction adds to train resistance, it is probable that further research on the Baltimore plant will be undertaken by the railroads. It is believed that this is the only truck turntable in existence with practically constant resistance under either uniform or eccentric loading as caused by track warp.

Derailing tests on depressed outer rail can be made anywhere, and the relative safety established for (1) reducing track warp, (2) canting the outer rail, (3) oiling the wheel flanges, and (4) any truck design.

Modern Conditions Unknown to Wellington

After careful research, Wellington states in "Railway Location," Appendix A, that on tangent, "about two-thirds of the velocity resistance proper, excluding the normal axle friction, is due to oscillation and concussion," which he "estimated at 1/2 lb. per ton at 10 miles per hour, varying as the square of the velocity." This resistance would then equal 8 lb. per ton at 40 miles per hour.

Two modern conditions were unknown to Wellington: (1) Rigid-body cars that put excessive weight on diagonally opposite side bearings on warped track, and (2) high-gravity cars that roll on their truck springs and, thereby, put high vertical and lateral pressures on the rails.

Nothing can be weighed except with suitable scales, or measured except with suitable instruments. It is believed that with a dynamometer car, the two research cars described in the *Railway Age* of September 22, 1928, constitute the only means in existence to record simultaneously and establish in service all the important facts concerning the dynamics of modern freight cars.

Attention is called to the fact that these dynamics have to do, not only with safety, but they are the vital factors in "oscillation and concussion" which Wellington estimated as responsible for an increased freight train resistance of 8 lb. per ton at 40 miles per hour.

* * *



On the Texas & Pacific Near Ysleta, Tex.

No Train-Control Installations Ordered

I. C. C. finds safety efforts in other directions will afford greater protection—Eastman dissents

EXPRESSING the opinion that a far greater measure of safety will be afforded by vigorous efforts to provide adequate protection against the larger number of accidents that arise from causes other than disregard of fixed signals than by requiring special efforts to extend train-control installations, Division 6 of the Interstate Commerce Commission (Messrs. Eastman, McManamy and Taylor) on November 28 announced its conclusion that additional installations of automatic train-control devices and automatic block signals will not be required by order at the present time. This conclusion was announced in the report, dated November 26, of the investigation undertaken by order of July 22, 1927, into the adequacy of existing installations of train-control and block-signal systems.

Diligence Urged in Accident Prevention Work

The carriers are urged to be diligent in their efforts to provide adequate protection against accidents due to grade crossings; to derailments and collisions in territory not protected by block signals; failure of wooden bridges and trestles, and the use of wooden passenger cars; and they are expected to undertake the necessary studies and tests to bring about standardization of design and method of installation of train-stop and train-control devices. The report also mentions as worthy of special attention the development of cab signals of the type now in use on the Pennsylvania. The commission's Bureau of Safety will keep in touch with the development work being done and the progress made pursuant to these suggestions, and the proceeding in docket No. 13,413 will be held open for such further order or orders as may be required.

The commission's order of June 13, 1922, which directed certain roads to make installations of automatic train-control devices is now modified to permit the "reset button" to be removed from its present location (on the tender) which requires engineers to incur the risk incident to dismounting from the locomotive in tunnels or on narrow bridges or other dangerous places, and to be located, protected by suitable housing, under the hood or overhang at the back of the cab, where it can be reached from the gangway between the locomotive and tender.

Train-Stop or Train-Control Installations

The effect of the installations of automatic train-control devices upon safety of operation in so far as accident prevention is concerned cannot be accurately determined, and there is no evidence of the actual prevention of accidents by the intervention of the automatic devices; and in the nature of things little affirmative evidence can be expected. The best indication available of the possibilities is said to be an analysis of the accident investigation reports for 1926, 1927 and 1928, set forth in a table in the report, as noted below.

An abstract of the report follows:

WASHINGTON, D. C.

Our orders of June 13, 1922, and January 14, 1924, required carriers to install on one or more passenger locomotive divisions train-stop or train-control devices in accordance with specifications prescribed therein. These orders included 8,388.1 miles of road, 15,174.1 miles of track, and 7,408 locomotives. Installations required by the two orders have been made as of May 1, 1928, by 44 carriers on 8,308 miles of road, 15,002 miles of track, and 7,345 locomotives. This comprises all but 88.7 miles of road, 192 miles of track, and 60 locomotives of the total requirements of the two orders. In addition, 188 locomotives are equipped by certain carriers for operating over portions of other roads, totaling 545 miles, in connection with installations of automatic train-control devices thereon.

Further installations have been made voluntarily by the Chicago & North Western on 137 miles of road, 338 miles of track, and 173 locomotives; by the Michigan Central on 78.5 miles of road, 156.9 miles of track, and 38 locomotives; by the New York Central on 550 miles of road, 1,762.5 miles of track; and by the Southern on 2,075.5 miles of road, 2,299.8 miles of track, and 557 locomotives. The voluntary installations total 2,841 miles of road, 4,557 miles of track, and 768 locomotives. The total installations comprise 11,238.5 miles of road, 19,751.9 miles of track, and 8,361 locomotives. The total cost was \$26,363,000. The cost of maintenance per mile of track per month as reported ranges from 39 cents to \$20.99; and per locomotive per month from \$2.85 to \$193.57.

Four general types of train-control devices are used: continuous induction on 40.5 per cent of the miles of track equipped; intermittent induction on 44 per cent; magnetic induction on 9.9 per cent; and intermittent electrical contact, or ramp type on 5.6 per cent.

The Pennsylvania and the West Jersey & Seashore have adopted a continuous system of automatic train control and cab signal, known as the "coder" system, which has been developed since the former hearings. The apparatus which operates the cab signal operates the automatic stop mechanism whenever the signal changes to a more restrictive indication. The coder system, it is claimed, has all the advantages of a continuous train-control system of other types, but may be used in connection with a. c. and d. c. track circuits and on tracks carrying a. c. or d. c. propulsion current.

The Pennsylvania plans to equip with this device the portion of its road between North Philadelphia, Pa., and Manhattan Transfer, N. J., and from time to time other portions of its main line, but without automatic stop apparatus on the locomotives. This road has installed the coder system on four divisions and is making changes in the system installed on its Baltimore division. The engine equipment costs about \$2,400 which is approximately the same as the engine equipment for the continuous systems heretofore installed. The cost of the track and way side equipment is also about the same in the two types. Without the automatic-stop mechanism, the cost per engine is \$400 less.

The total train-miles of operation of locomotives equipped with train-control devices over train-control territory has amounted to 122,488,089. The periods for which data were reported by each road ranged from 2 to 49 months. In many instances the installations were in service for longer periods than those for which data were given. The number of failures of the devices since installation was also reported. The period included was not in every instance the same as that for which train-miles of operation were reported. In such cases the figures showing train-miles covered a shorter period than the period since installation. The total false-clear failures were 118; undesired stops 23,083; and all other failures 15,085. When first placed in service the apparatus caused undesired stops and failed in other respects. These failures and undesired operations were gradually reduced in number. Faulty installation and unfamiliarity of employees with the operation of the devices were found to be the chief causes of trouble and no evi-

dence was presented to show that when properly maintained train-control devices will not operate as intended.

Block Signal Installations

On January 1, 1928, the passenger-carrying lines of railroad, excluding lines which operate but one locomotive, comprised a total of 199,153.7 miles of road; of this 112,992.4 miles were operated under some form of block system; 53,616.5 miles were equipped with automatic block signals which includes all mileage equipped with automatic train stop or train control; 59,375.9 miles were operated under the nonautomatic block system, leaving 86,161.3 miles which are not protected by any form of block signal system. During the five-year period ended January 1, 1928, automatic block-signal mileage increased 12,089.4 miles while nonautomatic mileage decreased 4,988.6 miles, leaving a net increase in the mileage operated under the block system of 7,100.8 miles. During the same period there was an increase of 7,090.9 miles in the passenger-carrying lines which leaves practically unchanged the relationship of mileage operated under the block system to total mileage.

Many railroads, on substantial portions of their roads, where trains are operated in considerable volume, have no automatic signals. In the month of heaviest traffic during 1926, on portions of lines not equipped with automatic block signals, trains were run as shown in Table B.

Table B—Passenger Trains Operated Without Benefit of Automatic Block Signals

Name of Road	Passenger Lines Operated, Miles of Road	Daily (week day) average number of trains over division		
		Passenger	All Other	Total
Ann Arbor	297	6	35	41
Buffalo, Rochester & Pittsburgh...	448	16	31	47
*Charleston & Western Carolina...	343	14	38	52
Chicago, St. Paul, M. & Omaha...	1,670	16	27	43
Los Angeles & Salt Lake.....	966	26	13	39
Minneapolis & St. Louis.....	1,253	12	42	54
Mobile & Ohio.....	986	7	30	37
*Virginian	503	6	27	33
Western Maryland	603	0	58	58
*Wheeling & Lake Erie.....	377	12	60	72
Yazoo & Mississippi Valley.....	1,707	8	27	35
Florida East Coast.....	840	27	29	56
Grand Trunk Western.....	329	12	28	40
Hocking Valley	333	6	43	49
*Minneapolis, St. Paul & S. S. M....	4,238	16	40	56
Nashville, Chat. & St. Louis.....	1,083	22	30	52
Seaboard Air Line.....	4,253	17	21	38
Texas & Pacific.....	1,940	8	33	41
Wabash	2,107	15	23	38

* Roads indicated by an asterisk have no automatic block signals; the others have varying lengths.

The Evidence

The carriers collectively through the Association of Railway Executives and the American Railway Association and individually by counsel appeared in opposition to an order requiring further installations of train-stop or train-control de-

eliminate grade crossings. In some instances the railroads are required or will be required to bear the entire expense and in others a portion, usually amounting to 50 per cent.

In response to our questionnaire the carriers among other matters reported the number of highway grade crossings eliminated in the period 1920 to 1926, both inclusive, and the cost to the carriers. These reports show that a total of 3,624 grade crossings were eliminated in the seven-year period 1920 to 1926 by the railroads included in this proceeding, at a cost to them of \$92,648,911. Large amounts were also expended for grade crossing protection by means of signals, gates, etc.

The total number of persons killed and injured in grade crossing accidents in the United States for the years 1923 to 1927, both inclusive, totaled 11,485 and 32,998, respectively. There can be no question as to the seriousness of the highway grade-crossing problem as presented in the foregoing figures.

The total number of derailments reported during the five-year period 1923 to 1927, inclusive, was 67,702. These derailments caused the death of 885 persons and injury to 8,971, and property damage in the amount of \$78,828,113.

The number of collisions reported during the same period was 27,822, which caused the death of 579 persons and injury to 9,817, and property damage in the amount of \$28,137,654. The above figures afford considerable support for the contention of the carriers with respect to the allocation of expenditures for the promotion of safety in train operation.

There were no serious objections such as were made at former hearings as to the practicability of such devices to perform their functions. In fact the witness who appeared on behalf of the Association of Railway Executives said:

This Association has nothing to say as to the merits or demerits of different types of automatic train-control devices or as to the relative efficiency of different methods or types in promoting safety.

Seven manufacturers or proprietors of automatic train-stop or train-control devices appeared and presented testimony to show the efficiency and the cost of installation of their respective devices, also their opinions with respect to the need for additional installations. No other testimony was presented in support of an order requiring additional installations.

Accident Records

Accident records show that there have been substantial decreases in the number of accidents and casualties. *** For the five-year period 1923-1927 our records show totals of derailments, collisions and grade crossing accidents as set forth in Table A.

The effect of the installation of automatic train control upon safety cannot be accurately determined. The best available information, as found in the records of investigations made by the Bureau of Safety, which investigations cover, in the last three years, 246 accidents, causing the death of 496 persons, may be summarized as follows:

[Here follows a table showing number of accidents, number

Table A—Derailments, Collisions and Crossing Accidents

Item	1923	1924	1925	1926	1927	Total
			DERAILMENTS			
Number of accidents	16,708	14,259	12,759	12,606	11,370	67,702
Killed	215	181	226	141	122	885
Injured	2,479	1,948	1,911	1,362	1,271	8,971
Damage to railway property, <i>thousands</i>	\$18,396	\$16,539	\$15,058	\$14,558	\$14,278	\$78,828
			COLLISIONS			
Number of accidents	7,115	5,166	5,166	5,572	4,803	27,822
Killed	126	103	121	149	80	579
Injured	2,383	1,808	1,758	2,311	1,557	9,817
Damage to railway property, <i>thousands</i>	\$6,905	\$5,078	\$5,502	\$5,902	\$4,750	\$28,138
			GRADE-CROSSING ACCIDENTS			
Number of accidents	5,218	5,127	5,479	5,862	5,640	27,326
Killed	2,268	2,149	2,206	2,491	2,371	11,485
Injured	6,314	6,525	6,555	6,991	6,613	32,998
Automobiles registered, <i>thousands</i>	15,092	17,592	19,954	22,001	23,127	

vices. The chief objections to further installations are that the costs of installation and maintenance are too great for the degree of protection afforded and that greater improvement in safety of operation will be obtained by expending available funds for automatic block signals on railroads or portions of railroads not now equipped, for better protection or removal of highway grade crossings, and for improvements and betterments such as additional main tracks, additional passing tracks, reduction of grades and curves, replacing wooden bridges or trestles by steel and concrete structures, installing heavier rails and steel passenger cars, and other improvements which not only add to safety in operation but also provide greater efficiency in service.

Particular stress is laid upon the growing demands for removal of highway grade crossings. Many States, counties, and municipalities are requiring the railroads to take measures to

of killed and number of injured in each of four classes, namely: (1) derailments, (2) collisions in automatic signal territory, (3) collisions in non-automatic signal territory and (4) collisions where there is no space interval, and collisions occurring in yards. The totals in this table show: number of accidents probably preventable by ATC in three years, 36; possibly preventable by block signals; preventable by ATC, 69; not preventable either by block signals or ATC, 141. This last figure represents mainly collisions in yards and derailments.]

Location of Reset Switch

Our order of June 13, 1922, requires that the apparatus shall be so constructed as to prevent the release of the brakes after automatic application until the train has been brought to a stop. *** Exception was taken by the Pennsylvania to this requirement. *** The reset switch has been so located that it could

not be reached from the cab of the locomotive. It may and does happen that the stop occurs at a point where it is dangerous to dismount from the locomotive. That this danger is a real one is clearly shown by the record. This record abundantly shows that the practice of locating the reset switch where it can only be reached from the ground has introduced a new hazard into the work of enginemen with no compensating advantages in the way of increased safety to others. Our former order will be modified. (see above.)

Cab Signals

*** There has been some development in this direction [cab signals] but the evidence with respect thereto is conflicting. Three carriers have removed wayside signals, *** but no carrier has wholly substituted cab signals for wayside signals at all points and there is nothing in this record which indicates an intention to do so. Cab signals are without doubt an important development in the art of signalling. They place the signal indication immediately in front of the enginemen where it can not be obscured by snow, fog, smoke, or other obstructions; and where a combination of visible and audible indication is used it is without doubt a valuable addition to the signal system. It is not contended that the removal of wayside signals in any way promotes safety, the only advantage claimed being a saving in maintenance expenditures. Against this it is shown that the indications of the cab signal can only be observed by the men in the locomotive cab, while the wayside signal in addition conveys its indication to trainmen who may be riding on top of the train or in the caboose cupola, trackmen, or extra gangs who are working on the track, crews of other trains on sidings, agents and others at stations, all of whom under certain conditions act on or are governed by such indications. In emergency cases trains are frequently backed for considerable distances in which event cab signals give no indication of track conditions in the direction in which the train is moving.

The use of cab signals with intermittent types of automatic train-control devices is desirable only in connection with wayside signals according to the testimony in the present proceeding. The reasons given in support of this view are that cab signals with intermittent devices give an indication only at a particular indication point at the moment a locomotive passes that point; that the indication thus received would be carried without change to the next indication point; and that no information of a change of condition ahead of the train could be given the enginemen by signal indication until the second point was reached, while a change in the indication of the wayside signal may be observed some distance before it is reached, the distance of course being governed by the range of vision and the degree of visibility existing at the time. In view of the conflicting testimony no change or modification of our former position with respect to the possibility of discontinuing the use of wayside signals will be made at this time.

Standardization

There are several hundred different types of automatic train-stop or train-control devices, many of which no doubt possess merit. From these each railroad selected the one which in the judgment of its officials best met its operating and financial situation. No one device possessed such outstanding merit as to make it the unanimous selection of all carriers. The result has been the installation of at least six different devices which are not interchangeable. This would not be so important if, as with automatic block signals, the complete functioning of the device required only shorting or breaking the track circuit which would be done by any vehicle, even a hand car. Transmitting an electric or a magnetic impulse to a receiver located on the locomotive and causing it to operate an actuator which manipulates the engineer's brake valve and applies the brake is an entirely different matter. Even this would not be so serious if each railroad was a complete entity owning all of its own terminals and operating over no joint track. That, however, is not the case. Joint terminals have become an established part of the transportation system of the country and joint track arrangements to reach such terminals or for other purposes exist upon every railroad upon which an installation of automatic train-stop or train-control devices has been ordered. We are therefore confronted with the problem of standardization without which the potential benefits of automatic train stop or train control can not be fully realized

except by a duplication of equipment at an excessive and possibly prohibitive cost.

*** We are not prepared at this time and are without authority to say how standardization should be brought about, but attention is directed to the fact that on January 17, 1888, five years before the passage of the act requiring the use of automatic couplers, the owner of the patents covering the contour lines waived all claims for couplers used on railroads members of the M. C. B. Association, as a result of which standard contour lines were established. Attention is also directed to section 3 of the act of March 2, 1893, which effectually standardized the power brakes then in use by authorizing carriers to refuse to accept in interchange cars not equipped with "such power or train brakes as will work and readily interchange with the brakes in use on its own cars as required by this act." It is probably true that the examples here referred to can not be literally followed and they are not given for that purpose. They do indicate, however, that it is possible through cooperative action to effectuate standardization of the essential features so that expensive duplication may be avoided.

Conclusions

The problem before us is to promote safety, which under any plan here suggested will involve tremendous expenditures. That fact, however, should not be controlling for the reason that loss of life or limb is always an irreparable injury to prevent which the utmost efforts should be exerted. It is therefore a sound principle that expenditures for the preservation of human life should be generous and should be so distributed that the greatest possible measure of protection may be afforded.

As stated in our first order, "the primary function of automatic train-stop or train-control devices is to enforce obedience to the indications of fixed signals." It has been shown in this case that the number of accidents and casualties which result from disregard of fixed signal indications is relatively small in comparison with those which result from other causes set forth in this record. We therefore believe that vigorous efforts to provide adequate protection against the larger number of accidents which arise from such causes will afford a far greater measure of safety than requiring by order special efforts to extend train-control installations. For that reason we have concluded not to require by order at the present time further installations of train-stop or train-control devices. The carriers should be diligent in their efforts to provide adequate protection against accidents due to grade crossings, derailments, collisions in territory not protected by block signals, failure of wooden bridges and trestles, and the use of wooden passenger train cars which have been repeatedly mentioned in our recommendations to the Congress. This in no way relieves the carriers from the responsibility which rests on them to provide additional protection where needed in territory now equipped with block signals. We shall therefore expect them to undertake the necessary studies and tests to bring about standardization of design and method of installation of train-stop and train-control devices so that they may be used in terminal areas and on joint track where traffic density is greatest without the necessity of expensive and inconvenient duplication of locomotive or wayside equipment.

The development of cab signals of the type now in use on the Pennsylvania appears to be an important forward step in the art of signalling and worthy of special attention. If the claims of that carrier were not overstated such signals will be particularly valuable on mountain grades where it has been vigorously contended that the use of any device which under any circumstances might take the control of the train away from the engineer would be a source of danger and not a safety device. The Pennsylvania will be expected to proceed with the further development of this device and to conduct suitable tests on its mountain division between Altoona and Pittsburgh, Pa., with a view to equipping that division if satisfactory results are obtained.

Our Bureau of Safety through its Section of Signals and Train Control will keep in touch with the development work being done and the progress made pursuant to the above suggestions and will keep us informed with respect thereto.

This proceeding will be held open for such further order or orders as may be required.

Commissioner Eastman Dissents

With what I believe to be the intent of the majority, I am in general agreement, but I differ as to the best method of giving effect to that intent. A demand for the use of some form of automatic train-stop or train-control device in steam railroad operation has existed for many years. The development and use of such automatic devices, moreover, have not been

the product of initiative upon the part of the carriers, but have chiefly resulted from governmental interference with their affairs thus paralleling in many respects the history of the air brake and the automatic coupler in freight train operation.

The situation by which we are now confronted is not the same as that which we faced prior to our former orders. Many

of the arguments now urged by the carriers against any further order are identical with arguments then urged; but it is now no longer contended, as it was then, that train-control devices are impracticable from the standpoint of practical and efficient railroad operation. Experience has shown the contrary. This is attested, among other things, by the fact that three large railroad systems operating in different parts of the country have voluntarily gone far beyond our orders in equipping their rails with train-control devices. Plainly these devices are past the experimental period and are now in what may be called the development period.

The question is whether the government, having accomplished this much, should proceed to issue and enforce further mandates corresponding to the orders heretofore issued or whether matters, for the present at least, can be allowed to take their natural course. At the threshold of this question we are met by the fact that there is nothing of record in this proceeding to indicate that the carriers, other than the three above mentioned, are likely to undertake any further installation of train-control devices of their own volition. The indications are, indeed, to the contrary.

Majority Position Not Unimpressive

The reasons for this position, which are summarized in the majority report, are not unimpressive. Briefly, the carriers urge that the funds which they can devote to the promotion of safety in operation are not unlimited, and that opportunities for expenditures to this end exist which are of far greater public importance than the opportunities presented by the further installation of train-control devices. Particularly they direct attention to the increase in grade-crossing accidents,*** coincident with the development of the automobile, and to the need for large expenditures of capital in the gradual elimination of such crossings; and they compare the really appalling loss of life and injury in connection with such accidents to the comparatively insignificant fatalities and casualties resulting from train collisions. That there is force in this argument must be conceded. Yet I am not convinced that it is controlling here. Grade-crossing accidents differ in essential respects from train collisions. The negligence of others rather than the negligence of the carriers is the great factor in the former, but it is not an important factor in the latter. Furthermore grade-crossing elimination is a community as well as a railroad problem, and the expenditures ought to be, and often are, shared by the States or municipalities with the carriers. Probably the communities ought logically to pay a larger share of the cost than they have in general been accustomed to pay, and I believe that the carriers might further this result if they would abandon their indefensible claims to a return upon the entire value of the property reconstructed in such grade-crossing eliminations regardless of who paid the cost of reconstruction. But that question is not here. The elimination of grade crossings has not been made our responsibility, but in the case of train-control devices the responsibility rests upon our shoulders.

Gradual Extension of Train Control Desirable

Granting that serious train collisions have become infrequent, to the credit of the carriers and public regulatory bodies, such accidents contain the possibilities of consequences so terrible that practicable steps toward the further reduction of their number cannot properly be neglected. Upon reflection I am convinced that the public interest, as well as consistency with what we already have done and with the intent of Congress, demands the gradual extension of the use of train-control devices.

The great range in the cost of the devices which have been installed with our approval and which have apparently operated satisfactorily shows pretty clearly, it seems to me, that an unnecessary cost has been incurred by many of the carriers. There seems to have been a tendency to install the most complicated, most expensive, and often least proven devices.

If the carriers were disposed to proceed voluntarily, even though somewhat slowly, with the work of further installation, I would not be in favor of further orders on our part at the present time. With the few exceptions already mentioned, they have indicated in this record no such disposition. Nevertheless I would be willing to give them one further opportunity for voluntary action, for they are in a better position than we can be to determine the lines where installations are most needed. Instead of leaving the matter entirely in abeyance, therefore, I would give the carriers six months from the service date of this report to lay before us definite plans which they are prepared voluntarily to undertake for the further installation of

train-control devices. Our further action with respect to orders would be dependent upon the information so furnished. If prospect of satisfactory progress were not indicated, we should issue an order.

Upon some minor points, also I am not wholly in agreement with the majority. Standardization is of course an important matter, but it may be doubted whether the different types of devices have yet been sufficiently tested and developed to make it desirable to adopt one standardized type. However, I presume that a good deal could be done in the way of standardization without the adoption of a single type.

With respect to the location of the reset switch, I fail to see anything wrong with the present rule. It does not, as the carriers apparently have assumed, require this switch to be so located that it cannot be reached by the engineman without dismounting. No great amount of inventive genius ought to be needed to make it possible to locate a reset switch in the cab within easy reach of the engineman and still comply with our requirements.

With respect to our rule which now permits forestalling, I am in doubt. There seems ground for the contention, as a result of our investigation of certain accidents which have occurred, that forestalling should only be permitted after the train has been brought to a predetermined speed or at least after a brake application has been made.***

President Hopes for Consolidation Legislation

WASHINGTON, D. C.

PRESIDENT Coolidge, in his message to Congress, reiterates his hope that railway consolidation legislation to remedy the defects found in the provisions of the Transportation Act on the subject may be enacted at an early date.

The text of the portions of his message dealing with railways and waterways follows:

In previous annual messages I have suggested the enactment of laws to promote railroad consolidation with the view of increasing the efficiency of transportation and lessening its cost to the public. While consolidations can and should be made under the present law until it is changed, yet the provisions of the act of 1920 have not been found fully adequate to meet the needs of other methods of consolidation. Amendments designed to remedy these defects have been considered at length by the respective committees of Congress and a bill was reported out late in the last session which I understand has the approval in principle of the Interstate Commerce Commission. It is to be hoped that this legislation may be enacted at an early date.

Experience has shown that the interstate commerce law requires definition and clarification in several other respects, some of which have been pointed out by the Interstate Commerce Commission in its annual reports to the Congress. It will promote the public interest to have the Congress give early consideration to the recommendations there made.

Our river and harbor improvements are proceeding with vigor. In the past few years we have increased the appropriation for this regular work \$28,000,000, besides what is to be expended on flood control. The total appropriation for this year was over \$91,000,000. The Ohio River is almost ready for opening; work on the Missouri and other rivers is under way. In accordance with the Mississippi flood law Army engineers are making investigations and surveys on other streams throughout the country with a view to flood control, navigation, waterpower, and irrigation. Our barge lines are being operated under generous appropriations, and negotiations are developing relative to the St. Lawrence waterway. To secure the largest benefits from all these waterways joint rates must be established with the railroads, preferably by agreement, but otherwise as a result of congressional action.

We have recently passed several river and harbor bills. The work ordered by the Congress, not yet completed, will cost about \$243,000,000, besides the hundreds of millions to be spent on the Mississippi flood way. Until we can see our way out of this expense no further river and harbor legislation should be passed, as expenditures to put it into effect would be four or five years away.

I. C. C. Annual Report

*Commission asks Congress for authority
to delegate its work*

WASHINGTON, D. C.

TO enable it to dispose more promptly of the voluminous matters entrusted to it the Interstate Commerce Commission, in its annual report to Congress for the year ended October 31, urges that it be given express statutory authority to delegate to individual commissioners and employees of the commission the power to perform specified duties, and to consider and determine specified matters and subjects, subject to the general control and supervision of the commission, and the exercise by it of appropriate powers of review either through the commission or a division.

The report calls attention to the fact that by section 17 of the act as amended August 9, 1917, it was authorized to divide its members into divisions of not less than three members and to assign functions to any division for action, but it says that "the continual growth in variety and volume of the work devolved upon the commission has made the performance of our duties less and less current."

Of the eleven recommendations made by the commission seven are repeated from previous reports. For the fourth consecutive year the commission reiterates its recommendation that the consolidation provisions of the transportation act be amended by omitting the existing requirement that it adopt and publish a complete plan of consolidation and by giving it broad powers to approve or disapprove plans for consolidation or other form of unification proposed by the railways. It also repeats its recommendations for legislation to punish bribery of employees in connection with car service; to prohibit the use of wooden passenger cars between or in front of steel or steel underframe cars; to clarify the recapture and valuation sections of the act; and to amend sections of the merchant marine act, 1920.

Recommendations

The other recommendations are as follows:

That each of the four subdivisions of section 10 of the interstate commerce act be amended to provide for a minimum penalty of not less than \$500 for each violation thereof.

That section 6 of the interstate commerce act be so amended as to authorize carriers operating within the United States to refrain from establishing and maintaining rates confined to the transportation within the United States of traffic shipped from and to points in the United States to and from points in Canada and Mexico, and, in lieu thereof, to maintain, and establish and maintain, and apply to the transportation of such traffic joint through rates entered into by and between carriers operating in the United States and those operating in Canada and Mexico, provided that, if action is taken in accordance with the option described in this paragraph, the responsibility and liability of the United States carriers and the jurisdiction to be exercised by the Interstate Commerce Commission, in connection with such joint through rates, shall be the same as

they would be if the transportation services covered by the joint through rates were performed and to be performed wholly within the United States, except that the commission shall not in any instance require the establishment of such a joint through rate.

That the present exemption provisions of paragraph (22) of section 1, paragraph (1) of section 15a, and paragraph (1) of section 20a, applicable to electric railways, be amended by substituting provisions exempting all electric railways except such as interchange standard freight equipment with steam railways and participate in through interstate freight rates with such carriers; provision to be made for exemption of particular electric railways falling within the excepted class, if upon application they are able to show to the satisfaction of the commission, after notice and opportunity to be heard, that they are not affected with an important national interest so far as the provisions in question are concerned.

Attention is called to "a tendency in the financial relations of carriers," described as "another method of effecting dominance in the affairs of competing carriers that may seriously affect the maintenance of competition and other relations among carriers," in the acquisition by individuals or groups of individuals of control of two or more carriers, which apparently refers to the actions of the Van Sweringens. "Whether such financial or other relations can or should be prevented under existing law," the report says, "is a question to which we have not heretofore had occasion to give consideration. The first instances of such individual acquisitions of relatively large railroads have only recently been brought to our attention."

Regarding the recommendation for a minimum penalty under section 10 the report says it is vitally important in maintaining the regular tariff rates by compelling accurate and truthful description and classification by shippers of their property and that "providing a minimum penalty of not less than \$500 for each violation thereof will render far more effective the efforts of the commission to enforce that section."

Under the head of the Bureau of Accounts the report says the volume of work involved in the determination of excess income of steam railroads subject to recapture has made it necessary for the bureau to devote substantially all the time of its field force to accounting examinations under section 15a and that during the year it has made 813 examinations under that section, as well as 40 special examinations.

The statement of previous reports is repeated that no general examinations of carriers' accounts were made during the year and this omission is regarded "as seriously impairing the effectiveness of our regulation of carriers' accounts under section 20 of the act, an im-

Sales of equipment obligations					Sales of bonds				
Year	Principal amount sold	Weighted average			Principal amount sold	Weighted average			Yield per cent to public
		Spread in price to bankers and to public per \$100	Cost per cent to carriers	Yield per cent to public		Spread in price to bankers and to public per \$100	Cost per cent to carriers	Yield per cent to public	
1920 (7 months).....	\$2,400,000	\$1.91	7.13	6.81	\$25,000,000	\$3.47	7.50	7.00	
1921	19,621,000	2.295	6.81	6.465	342,104,000	4.54	7.25	6.74	
1922	86,390,000	2.33	5.74	5.31	304,487,000	3.55	5.94	5.675	
1923	255,168,000	2.33	5.72	5.34	144,007,000	2.815	5.51	5.35	
1924	198,333,000	1.86	5.26	4.945	430,452,000	3.17	5.61	5.38	
1925	100,216,000	1.80	5.14	4.85	298,295,500	2.95	5.52	5.39	
1926	92,313,000	1.47	4.95	4.71	205,148,000	2.62	5.28	5.10	
1927	60,097,000	0.66	4.59	4.49	499,926,500	2.60	5.10	4.94	
1928 (6 months).....	28,185,000	0.612	4.305	4.203	290,259,000	2.326	4.68	4.55	

portant feature of which is the policing of carriers' accounts."

The report of the Bureau of Finance shows that during the year 33 certificates were issued authorizing new construction to the extent of 717 miles, 61 for abandonment of 587 miles and 54 authorizing operation or acquisition and operation of 14,764 miles. In the last report it was stated that of the railway mileage for which the commission had issued certificates authorizing new construction since the effective date of the provision of the act relating to certificates, the commission had information that approximately 3,112 miles of road had been constructed. During the past year, according to advices received from carriers, the construction of approximately 311 miles of road has been completed. Under paragraph 2 of section 5, 45 applications have been filed during the year for authority for acquisition of control in a manner not involving consolidation, and 31 authorizations have been issued, 3 applications have been denied and 2 withdrawn.

During the year 9 carriers paid the commission a total of \$868,277 as one-half of their excess income preliminarily computed by them for the several recapture periods, which, added to the \$7,140,930 paid prior to November 1, 1927, makes the total of such payments \$8,007,208. Of the formal hearings assigned for the determination of excess net railway operating income, 32 have been concluded, 13 are in progress, and 5 have not as yet been opened.

The commission received during the year 183 applications and 46 supplements thereto for authority to issue securities and authorized issues amounting to \$1,871,200,314 in addition to 2,149,867 shares of stock without nominal or par value. The total includes \$272,688,563 of preferred stock, \$267,950,801 of common stock, \$1,188,504,867 of bonds, \$30,800,000 of debentures, \$42,580,023 of notes, \$60,816,952 of equipment obligations, and \$7,803,007 of receivers' certificates. Certificates of notification of the issue of notes maturing within two years, in the aggregate sum of \$125,480,047, were filed under paragraph 9 of section 20a.

On the subject of competitive bidding for equipment trust certificates the report includes the following:

Our views as to the advantages of competitive bidding in the sale of equipment-trust obligations are set forth in our report in *Western Maryland Equipment Trust*, 111 I. C. 434, decided June 23, 1926. Since the date of that report, except in a few cases where we felt that the facts justified other disposition, we have required that carriers requesting authority to assume obligation and liability in respect to such securities offer them for sale at competitive bidding. Of interest in this connection are the following tables covering respectively the sales of equipment obligations and bonds in amounts of \$100,000 and over to bankers, and resales by them to the public, in cases where complete sales information is available:

All but 6 of the claims filed for the six months guaranty after the termination of federal control have been disposed of, 522 having been settled and 139 having been dismissed. Six hundred and sixty-seven carriers filed claims aggregating approximately \$680,000,000 and the commission has certified \$528,978,502 and estimates that the remaining 6 will require approximately \$200,000.

Under the head of the work of the Bureau of Valuation the report says that there now remain only three hearings to be concluded in connection with the primary valuations and that the work is now centering in bringing the valuations down to the later date of December 31, 1927, and work preparatory to further recapture proceedings after the Supreme Court renders its decision in the O'Fallon case, now set for argument on January 2. Final valuations have been reached in

735 cases, covering 83,830 miles, or 34.5 per cent of the total and it is hoped to complete the issue of final reports in this fiscal year. Pending the Supreme Court's decision in the O'Fallon case, no recapture hearings have been conducted during the past year.

Class Rates

Following a review of the class rate readjustments, two of which, involving rates in eastern and western trunk line territories, are still pending, the report says: "We feel warranted in saying that while modifications of the readjustments of southern and southwestern rates which became effective during the year will in all probability be necessary in the light of actual experience, such readjustments represent the most important step yet accomplished in the direction of a more systematic rate structure."

Formal Docket

The formal complaints filed during the year numbered 1,693, of which 1,404 were original complaints and 289 subnumbers, an increase of 132 as compared with the previous period. The commission decided 1,418 cases and 482 have been dismissed by stipulation or on complainant's request, making a total of 1,900 cases disposed of, as compared with 1,446 during the previous period.

Approximately 200 formal and investigation and suspension cases have been reopened for further hearing and reconsideration.

The commission conducted 1,415 hearings and took 319,557 pages of testimony, as compared with 1,600 hearings and 291,299 pages of testimony during the preceding period.

The following statement shows certain facts with respect to the condition of this docket as of October 31 of the years indicated:

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The following statement shows certain facts with respect to the condition of this docket as of October 31 of the years indicated:

	1925	1926	1927	1928
Formal complaints filed	1,210	1,314	1,318	1,404
Subnumbers	295	210	243	289
Investigation and suspension cases instituted	275	268	213	189
Cases under submission at end of period:				
Regular docket	359	462	633	483
Shortened procedure	56	136	291	230
Cases disposed of, including subnumbers and reopened cases.....	1,340	1,499	1,657	2,166

Hoch-Smith Proceedings

In an outline of the progress made in the 11 separate inquiries undertaken under the Hoch-Smith resolution the report shows that hearings have been completed in seven, briefs have been filed in five and a proposed report has been issued in one. In Part 2, Western Trunk Line Class Rates, about 12,500 pages of testimony were taken and about 1,200 exhibits were received while 60 briefs have been received. In Part 3, Cotton, over 7,000 pages of testimony were taken; in Part 7, Grain and Grain Products, the completed record includes 55,000 pages of transcript and 2,106 exhibits.

Under the head of "Railroad Earnings" the report includes the following:

The postwar peak in Class I railway operating revenues was reached in 1926, when they totaled 6.38 billions of dollars. In 1927 the revenues were 6.14 billions, which was a decrease of 3.86 per cent. For the first six months of 1928, the revenues were 3.90 per cent under those of the first half of 1927, but for July and August, 1928, an increase of 0.31 per cent over the same months of 1927 was reported. The net result is that for the first eight months the revenues for 1928 were 2.80 per cent under those of 1927, 4.67 per cent under those of 1926, and 0.10 per cent over those of 1925, for the same period in each case.

The end of the decline in passenger revenue, caused by the competition of other forms of conveyance, is not yet apparent. For the first eight months of 1928 the passenger revenue of Class I railways was \$52,905,209 less than in the same period in 1927. For the year 1920, the passenger revenue and the number of passengers and passenger-miles exceeded the corresponding figures for any year before since. The decline in these items since 1920 is shown by the following table:

Year ended Dec. 31—	Passenger revenue (thousands)	Passengers carried (thousands)	Passenger-miles (thousands)
1920	\$1,286,613	1,234,862	46,848,668
1921	1,151,770	1,035,496	37,312,586
1922	1,074,108	967,409	35,469,962
1923	1,145,698	986,913	37,956,595
1924	1,075,039	932,678	36,090,886
1925	1,056,395	888,267	35,950,223
1926	1,041,816	862,361	35,477,525
1927	974,950	829,917	33,649,706

As compared with conditions in 1920, the passenger revenue of 1927 declined 24.2 per cent, the number of passengers declined 32.8 per cent, and the number of passenger-miles declined 28.2 per cent. These declines are striking, but in considering their significance from the standpoint of railroad finance, it should be considered that the development of the automobile industry has helped to swell the freight revenue. The freight revenue of Class I railways in 1927 was greater than it was in 1920, but on account of rate changes, a more satisfactory comparison is on the basis of ton-miles. The ton-miles of Class I railways were 410.3 billions in 1920, 443.7 billions in 1926, and 428.7 billions in 1927. This comparison understates the real growth in freight business because 1920 was an abnormally high peak. A study of ton-miles and passenger-miles over a longer period reveals that whereas passenger-miles show a decided falling away from the pre-war trend, the freight ton-miles show a sustained growth, the traffic of the war period being regarded as both abnormal and temporary.

Operating expenses were curtailed to the extent of \$95,158,915 in 1927, or 2.04 per cent, as compared with those of 1926. The ratio of operating expenses to revenues increased from 73.15 in 1926 to 74.54 in 1927. For the first eight months of 1928, the expenses were reduced \$122,909,120, as compared with those of the same period in 1927, the operating ratio having been 74.54 in this period in 1928, as compared with 75.46 in 1927.

The composition of operating expenses shows but little variation in recent years:

Per Cent of Total Operating Expenses, Class I Steam Railways

Account	1925	1926	1927	First 8 months	
				1927	1928
Maintenance of way and structures	18.0	18.6	19.0	19.0	19.0
Maintenance of equipment	27.8	27.5	26.7	26.7	26.4
Traffic	2.3	2.5	2.6	2.6	2.8
Transportation	47.1	46.7	46.5	46.7	46.6
General	3.9	3.9	4.2	4.1	4.3
All other .....	.9	.8	1.0	.9	.9
Total	100.0	100.0	100.0	100.0	100.0

The ratio of maintenance expenses to operating revenues also has shown but little variation in this period, having been 33.9 in 1925, 33.7 in 1926, 34.0 in 1927,

and 33.8 in the first eight months of 1928, as compared with 34.5 in the same period in 1927.

Taxes, which were \$12,812,606 less in 1927 than in 1926, again show a decline in 1928, having been \$2,397,535 less in the first eight months of 1928 as compared with the same period in 1927. The total railway tax accruals of 1927 were \$376,110,250, of which \$84,591,260 was payable to the Federal Government.

In 1927 the steam railways of all classes had a net railway operating income of \$1,077,841,658 available for interest, leased road rentals, and miscellaneous deductions, dividends, or surplus. This was \$151,178,530 less than for 1926. For the first eight months of 1928 the net railway operating income of Class I railways shows an increase of 1.30 per cent over the corresponding figure for 1927.

The net income of all steam railways after fixed charges in 1927 was \$741,923,916, a decline of \$141,497,879 from the income of 1926. The ratio of net income to capital stock declined from 9.43 per cent in 1926 to 7.78 in 1927. The per cent of stock in the dividend paying class was 69.12 in 1926 and 70.25 in 1927. The amount of dividend declared, including intercorporate dividends, was \$567,280,717 in 1927, which sum was 5.95 per cent of all stock actually outstanding. The average rate declared on dividend yielding stock was 8.47 per cent.

Transportation Refrigeration

A COMPREHENSIVE investigation of the necessity of body icing of refrigerator cars and its effect on transportation equipment is being conducted by the Department of Agriculture, according to the annual report of its Bureau of Plant Industry. From work done with lettuce, cauliflower, celery, and green corn it was determined that body icing in some form is advisable at certain seasons of the year from some regions with all of these vegetables. Likewise, it appeared to be essential in the shipment of green peas and some other highly perishable vegetables when shipped long distances. It was found also that the presence of water in the car from the melting ice caused disintegration of the insulation and that water in the insulation decreased its efficiency. Investigation is being carried on as to the best means of waterproofing car floors so as to prevent damage to the equipment.

A method of precooling cars, which consists of two blowers driven by small motors, has been devised. By properly adjusting these blowers and regulating the openings from the bunkers into the cars it is found possible to lower the temperature of a car of strawberries at the average rate of about 4 deg. F. per hour, the top layer of the load being cooled the most rapidly. With the berries loaded into the car at a temperature of about 65 deg. which is a common condition, it is possible to precool a load to a good carrying temperature in from five to six hours. This method of precooling is cheap, simple, and easily applied, and the results thus far indicate that it is very efficient.

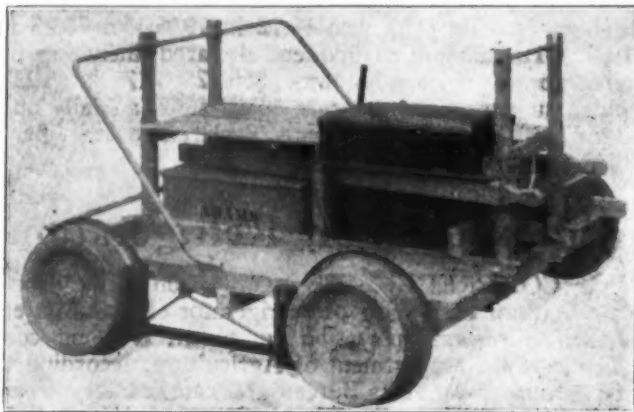
An insulated pony refrigerator has been developed and tested in comparison with the ordinary type of pony refrigerator in shipping strawberries from Florida. The insulated refrigerator that has been developed weighs about the same as the ordinary pony refrigerator, but it requires considerably less ice in transit, and in the tests thus far made it maintains a lower temperature than the ordinary type. Furthermore, it has certain other advantages, particularly with respect to protecting the fruit against the drip of moisture from the ice pans.

Motor Car Embodies New Features

A CENTER-LOAD, direct-connected track motor car has just been placed on the market by the Adams Motor & Manufacturing Company, Chicago. This new car, designated as the Series 10, is designed for the use of roadmasters, division engineers, signal maintainers and others with inspection duties. It will carry four men comfortably.

It has a direct-connected, air-cooled, two-cycle motor, with a $4\frac{1}{4}$ -in. bore and a $4\frac{1}{2}$ -in. stroke. The crank shaft is mounted on Timken roller bearings and the connecting rod bearings are bronze-backed, babbitt-lined. The carburetor is a standard automobile type, and ignition is by means of battery and spark coil. The engine has compression relief and coaster valves.

The transmission system is unusual. The engine is mounted in such a position that the crank shaft is in



The Adams Series 10 Motor Car Has a Direct-Connected Air-Cooled Two-Cycle Engine

exact line with the rear axle, which is in two parts that are short enough just to clear the ends of the crank shaft. The connection between each end of the engine shaft and the adjacent end of the axle is made with a fabric universal joint.

The axles are chrome nickel steel forgings, heat treated and finished all over. There are two opposed Timken roller bearings in each malleable iron axle box, and the end thrust is taken on a shoulder between these bearings, forged integral with the axle.

There are no oil or grease cups on the car. The axle boxes are lubricated with light grease, which is replenished once a year. The front axle is also in two parts, connected by a steel sleeve to give a loose wheel effect. All four wheels are alike and are tight on the axles. They have forged steel hubs, with 14-in. cone treads and wood centers for insulation. Four-wheel brakes and wheel guards are standard equipment. Skids between the wheels are provided for quick and easy removal from the track.

The frame posts and rails are made of birch. The seat deck for the No. 10 model is 21 in. by 53 in., with a carrying space on each side measuring 15 in. by 51 in. Pull-out handles are provided, which, when extended, require a lift of about 135 lb. The Series 10 is made with both 42-in. and 36-in. wheel-bases, both sizes being equipped with a cushion and tool tray if desired. Although the engines of all models have Timken roller bearings, plain axle bearings can be furnished when desired in place of the Timken axle bearings.

Looking Backward

Fifty Years Ago

One of the most important railway enterprises of the year was completed on December 1 when the last spike was driven in the Pembina branch of the Canadian Pacific, establishing unbroken rail communication between Winnipeg, the capital of Manitoba, and St. Paul, Minn., and Chicago. The Pembina branch will be operated by the St. Paul & Pacific [now the Great Northern] under lease from the Canadian government. Through trains will make the trip between St. Paul and Winnipeg in 30 hours.—*Railway Age*, December 5, 1878.

The movement to replace the brass ornamental work on engines with plain black finish has progressed very rapidly within a few years, effecting a saving which in the aggregate must be considerable. It is true that an engine presenting to view an unrelieved black from pilot to tender does not have that splendor of appearance given by highly colored brass and brilliant gilding and striping, but it does seem to draw just as well, and the road does not show any falling off of passengers or freight on account of the plainer finish.—*Railway Age*, December 5, 1878.

Twenty-Five Years Ago

The United States Supreme Court, on December 8, denied the application of the Northern Securities Company to dismiss the appeal of the State of Minnesota from the decision of the United States Court of Appeals in favor of the Securities Company.—*Railway Age*, December 11, 1903.

On December 6 the Chicago, Milwaukee & St. Paul operated for the first time on regular schedule its new limited trains between Chicago and Kansas City, Mo., over the cut-offs between Ashdale, Ill., and Fulton and between Muscatine, Iowa, and Ottumwa, which shorten the route by nearly 50 miles.—*Railway Age*, December 11, 1903.

The recent line revision on the Southern Pacific between Ogden, Utah, and Reno, Nev., 322 miles, which includes the Ogden-Lucin cut-off across Great Salt Lake, has required an expenditure of nearly \$9,000,000. This work has resulted in saving 50 miles in distance, 12,690 deg. of curvature and 3,064 ft. of rise and fall. The maximum grade has been reduced from 1.7 per cent to 1.4 per cent and the sharpest curve has been reduced from 10 deg. to 4 deg.—*Railway Age*, December 11, 1903.

Ten Years Ago

S. J. Hungerford, general manager of the Canadian Northern lines east of Port Arthur, Ont., has been appointed assistant vice-president, with jurisdiction over all lines of the Canadian Northern and the Canadian Government Railways, with office at Toronto, Ont.—*Railway Age*, December 6, 1918.

Director General McAdoo announced on December 5 that he had accepted the resignation of Judge Robert S. Lovett as director of the division of capital expenditures of the Railroad Administration, effective January 1. Judge Lovett will return to the Union Pacific as its president.—*Railway Age*, December 6, 1918.

Early relinquishment of the railroads from the present form of control by the government, unless Congress shall be able to formulate within a reasonable time a definite and acceptable plan for the future policy towards the roads, was forecast by President Wilson in his address before a joint session of the two Houses of Congress on December 4. He declared it unfair to both the public and the owners of the railroads to leave the question of their disposition unanswered.—*Railway Age*, December 6, 1918.

Communications and Books

Advertising in Public Timetables

BOSTON, MASS.

TO THE EDITOR:

I have often wondered why railroads do not endeavor to secure advertising revenue from their public folders the same as other publications do. As it stands today timetables contain nothing but train information. Why is it not possible to solicit advertisements and put them in the folders, charging rates that would cover the cost of printing the public folders and thereby relieve the railroads of this heavy expense?

No doubt business concerns would readily agree to pay substantially for advertisements that would be read by thousands daily. In these days of competition every dollar saved helps to pay for improvements or to give the stockholder a fair return on his investment.

T.M.B.

"Sole Leather and Calf Muscle"

LOS ANGELES, CAL.

TO THE EDITOR:

The editorial in the *Railway Age* of October 6, entitled—"There is No Royal Road to Railway Location"—is interesting, but I doubt very much if the automobile or airplane can be used in making a reasonably close reconnaissance or obtaining anything of real value for railroad location. I recall an engineer who came up through the various positions on a locating party, and on construction, as superintendent of construction and two years as operating superintendent, to the interesting position of locating engineer. After making a reconnaissance of 703 miles for a company which was starting a transcontinental line, some parts of which he covered twice, he went back to a section in about the center of the line, 178 miles in length, which seemed to need particular study. He drove over this stretch again with his team and buggy, it being his practice always to have a driver so that he might get out and examine points of particular interest on foot. After driving over this portion again, he walked over it, carefully noting controlling points on sheets adapted to topographical work.

There is no doubt that the editor's statement—"There is no substitute for sole leather and calf muscle"—is true.

W. R. ARMSTRONG,
General Superintendent,
Los Angeles & Salt Lake.

New Book

Marketing and Advertising, by Floyd L. Vaughan. Bound in cloth. 255 pages 8½ in. by 5½ in. Published by the Princeton University Press. Price \$2.50.

While this economic appraisal of present day marketing and advertising practice is devoted mainly to a discussion of services performed by trading functionaries in the distribution scheme of the nation, it is nevertheless of interest to railway men in its brief reference to the function of transportation agencies in their work of attaching place utility to the value of goods. In this latter section of the book considerable space is devoted to what the author calls indirect subsidies to transportation agencies.

Here he considers highway carriers and states that whether or not these represent fair competition depends partly upon the extent to which they pay the expense of building and maintaining the highways which they employ. While in this connection the discussion concedes that license fees and gasoline taxes have greatly increased, the conclusion is nevertheless reached that these automobile carriers "do not yet pay a proper proportion of the cost of building and maintaining the specialized highways designed for their use. Who bears the remainder of the expense of such thoroughfares?" is next asked. Whereupon the answer given by the author is, "The remainder comes from taxes levied on other property and in this connection, it should be borne in mind that in most counties the railway constitutes the chief taxpayer." This situation

means that the railway carries a considerable part of the burden of providing a 'track' for its competitor".

After elaborating on this competitive situation and contrasting governmental regulatory policy in the railway field with the present lack of such policy in the field of highway transportation this section concludes with the suggestion that "Automotive transport should be encouraged, of course, as a feeder of the railway.... From this standpoint the truck and bus are allies of the railroad. The automotive carrier and the railway, if running at right angles to each other, would furnish an admirable system of transportation, one which has not been attained thus far."

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian,
Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Mundy's Earning Power of Railroads, 1928, compiled and edited by Floyd W. Mundy, 23rd issue of an informative little volume, the annual issues of which have become especially valuable to college students who put off their term papers until two days before they are due. 581 p. Pub. by Jas. H. Oliphant & Co., New York City.

War History of American Railroads, by Walker D. Hines. The second Director-General narrates the complete history of an important period. Issued as a volume in the American series Economics and Social History of the World War. 327 p. Pub. for Carnegie Endowment for International Peace by Yale University Press, New Haven, Conn. \$3.75.

Annual Report of the Secretary of the Interior for the Fiscal Year Ended June 30, 1928. "Railroad grants and selections" p. 49. "Revested Oregon & California Railroad and Coos Bay Wagon Road grant lands" p. 49-50, "Rights of way" [thru Indian lands] p. 68, "The Alaska Railroad" p. 196-198. 222 p. Pub. by U. S. Govt. Print. Off., Washington, D. C.

Industrial Explorers, by Maurice Holland. While no railroaders are included, railroaders may be interested in E. A. Sperry of Gyroscope and transverse fissure detector car fame, Jewett, who made Trans-Atlantic telephoning practicable, Baekeland, who originated "bakelite", Arthur D. Little, and the others included in the biographical sketches. 347 p. Pub. by Harper's, New York. \$3.

Report of the Railway Electrification Committee (1927), Ministry of Transport. Brief survey of electrification in Gt. Brit. at present time, with recommendations for future development. 14 p., 5 drawings, and 3 folding maps. Pub. by H. M. Stationery Office, London, England. 6 shillings, sixpence. Available in this country thru British Library of Information, New York City.

Periodical Articles

From Covered Wagon to Aerial Express, by Edgar L. Hampton. Various stages of transportation to the Pacific coast. *Travel*, December 1928, p. 27-29, 46.

Statistics of Rail Breakages During the Year 1927. Statistics for American railways, p. 945-953. The different weights of rail in the several countries and colonies is noteworthy. *Bulletin of the International Railway Congress Association*, November 1928, p. 930-1021.

A Bull Market in Stock Minus the Rails, by Charles F. Speare. "One of the most amazing aspects of the present amazing stock market is the virtual boycott by Wall Street of the standard investment railroad issues." *Journal of the American Bankers Association*, November 1928, p. 437. Reprinted in *Commercial & Financial Chronicle*, December 1, 1928, p. 3039-3040.

Odds and Ends of Railroading

Railway Legislation

Gordon Childers, engineman for the Chicago & Alton running between Chicago and Bloomington, is a full-fledged senator now, having been elected to the state senate from the 26th senatorial district of Illinois. He is reported to be the first of his calling so honored in Illinois.

A Bell-Ringer

Those railway men who are radio fans and who can "raise" station KHJ, Los Angeles, in the evening, may have heard the locomotive bell ringing out the hour. This is done by the practiced hand of Fireman R. H. Angier, of the Southern Pacific, who also announces occasionally and who has performed as a monologist at no less than seven stations.

The Locomotive

(The following Quatrain, written by a junior at Rollins College, Florida, seems to express its thought excellently.)

Across the parchment of the earth,
I write with hissing pen,
The autograph of industry,
The manuscript of men.

Dots and Dashes

A bunch were riding ahead in the smoker "railroading." A superintendent was telling how they hazed him on his first day as a dispatcher. One of the boys had a key rigged up in the next room. He called the new dispatcher and ordered a car for loading zig-zag ice and iron. He did not get it, of course. The call came again, the new dispatcher trying to figure what it was they wanted. Then, the hazer simply threw a whole handful of dots at him and came forth to reveal the secret.

The talk drifted to other telegraph stories and the dot story suggested the brass pounders' interest in the new name of the C. M. & St. P. which is now C. M. St. P. & P. In the Morse code, the letter "P" is represented by five dots. What makes it interesting is the fact that the figure six is represented by six dots, so there is plenty of opportunity for some ham to transmit "C. M. & St. P. 665734" instead of "C. M. St. P. & P. 65734." Which reminds us of a story told in a southwestern relay office about receiving a report from a telegraph department trouble shooter whose wire report, as transmitted read "Line repaired tell Polarity." No one knowing Polarity, it was finally decided that the operator meant to say "Line repaired temporarily."

JOE MARSHALL.

Tough Luck, Old-Timer

The quirks of Fate are sometimes inexplicable and the victims of her caprices may be the last persons one would expect. Take the case of Robert Hammill, for instance. "Uncle Bob" has been working for the Reading for a long time, 51 years in fact, on the Camden-Atlantic City run, most of that time at the throttle. During all that half century, there were no accidents to mar his record. The building up of a record such as this for efficient, conscientious service is fully as commendable an achievement as building a city, writing good books, carving masterpieces of sculpture or spanning the ocean in a plane, although it may not be as spectacular. With such a record behind him, a man may feel a conscious pride that he has not lived in vain. So it was with Uncle Bob as he climbed into the cab for his last run. Many of his friends were there, as were the trainmaster and the superintendent. The retirement of a master engine-driver such as Uncle Bob is not an everyday occurrence. Then Fate stepped in. Hardly had the train gathered full speed under Bob's practiced hands, when an automobile made an insane and hopeless attempt to beat the train at a grade crossing. An instant later, the mangled bodies of

the driver and his young daughter gave tragic evidence of his folly. No shadow of blame could be attached to Uncle Bob. The responsibility was entirely with the driver of the car. Nevertheless, the perfect record of 51 years was a crumbling ruin. The long and peaceful days of retirement, which Uncle Bob so richly earned must ever be shadowed. Every railroader extends his sympathy.

The Omnipresent Railways

"The United States has been aptly called a railway-created country," says Mark Jefferson, professor of geography at Michigan State Normal College in a recent issue of *Economic Geography*. "Railways here enabled men to carry civilization into a trackless wilderness and create there widespread prosperity." Mr. Jefferson used a map to prove the part the railways have played in bringing service everywhere. This map showed that, except for the southern tip of Florida, and a few other isolated spots, there is not a point in the United States east of a line drawn through the approximate center of Kansas, Nebraska, North and South Dakota, that is not within ten miles of a railway. Following out Mr. Jefferson's line of thought, it is noted that, of the 3,068 counties in the United States, only 109, or about 3½ per cent, are without railway service. While many of the county seats are only small hamlets, railways serve all but 278 such towns. In the States of Iowa, Maine, Delaware, Rhode Island, New Hampshire, New Jersey, South Carolina and Vermont, every county seat is served by a railway, in Arizona, Connecticut, Michigan, Minnesota, Nevada, Ohio, Oklahoma and Pennsylvania, all but one of the county seats are served by railways. The states having 20 or more county seats not served by railways are: Virginia, 34; Texas, 28; Kentucky, 26, and Tennessee, 20.

The Old Red Box Car

There are several hundred thousand box cars doing yeoman service on the railroads of the country, and a large number marking time as necessary adjuncts in the M. of W. service. With a few more or less conspicuous exceptions, these box cars are painted red, and they have always been painted red, and likewise a long line of illustrious ancestors have borne the same hue.

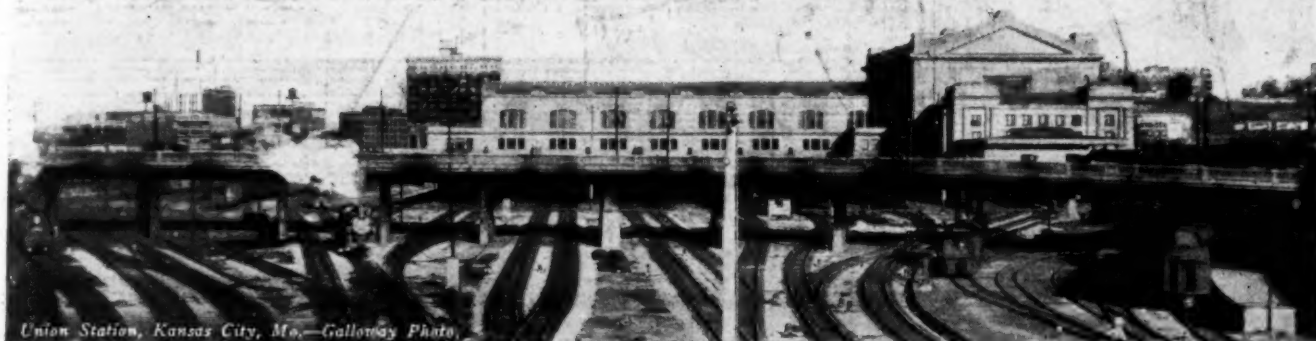
There are many shades of red, but "box car red" is a red peculiarly its own and practically as unchangeable in color as the statutes which prescribed the conduct of the Medes and Persians. Look into the big rail terminals or upon side or passing tracks the country over, and strings of the humble freight containers of weathered pigment, but always red. Some are less red than others, but the variation has been caused by meteorological vagaries and not by specifications.

Box cars are painted red because they have always been so decorated. The yellow and green ones are only variations. The first box car I ever saw, and the first one anybody can remember to have seen, was red. Now red is red sometimes when it is brown, but that means nothing in the business where pastel shades and "morning mists" have no place except in upholstery and even there we stick to colors that need no dictionary to describe.

Why are they red—well, just because, I guess. From the standpoint of art they might have been mauve with ivory striping, but who expects art in a box car? The chaps who first wrestled with standards evidently ran the gamut of colors when they picked the prosaic but utilitarian hue, they hadn't reached the present demand for variations of the spectrum, nor sat up nights striving for color harmonies that might match with my lady's abbreviated petticoats, if there are any such things, or the delicate shades which so aptly mimic nature on the feminine cheek.

Box car red is cheap, enduring, doesn't spoil the landscape, is easily applied and, above all things, it's standard.—Southern Pacific Bulletin.

NEWS of the WEEK



Union Station, Kansas City, Mo.—Galloway Photo.

SENATORS McNARY AND STEIWER, of Oregon, called on President Coolidge on November 28 to urge the reappointment of Clyde B. Atchison as a member of the Interstate Commerce Commission, whose term expires at the end of the year.

THE 48TH ANNUAL CONVENTION of the American Electric Railway Association will be held in the new municipal auditorium, Atlantic City, N. J., September 28 to October 4, inclusive 1929. In connection with the Convention, the operating and manufacturer members of the association will hold the usual exhibit.

FIVE STRATHCONA FELLOWSHIPS in transportation are to be awarded by the Graduate School of Yale University, preference to be given to persons or sons of persons who have, for at least two years, been connected with the railways of the northwest. Blanks may be obtained from the Dean of the Graduate School, New Haven, Conn., and applications must be handed in before March 1.

REPRESENTATIVES OF THE AMERICAN RAILWAY ASSOCIATION, consisting of W. H. Clegg, chief inspector of air brakes and car heating equipment, Canadian National; R. C. Burns, assistant engineer, Pennsylvania, and G. H. Wood, general air brake instructor, Atchison, Topeka & Santa Fe, recently participated in a service test on the Butte, Anaconda & Pacific of the automatic connector developed by the Consolidated Connector Corporation, Cleveland, Ohio, for automatically coupling air and steam hose between passenger and freight cars.

Corrections

In the *Railway Age* of November 24 it was erroneously reported that the Railway Business Association would meet next year in Chicago at the Hotel Sherman. Instead the Hotel Stevens should have been named as the place of meeting.

Although it was announced in last week's *Railway Age* that the Purchases & Stores Division, A. R. A. would hold its next annual meeting in San Francisco, California, June 19-21, the exact time of the meeting will not be determined until

the meeting of the general committee in January, according to W. J. Farrell, secretary, although it has been definitely decided to hold the meeting in San Francisco.

Wage Statistics

The total number of employees reported to the Interstate Commerce Commission by Class I railways as of the middle of the month of September, 1928, was 1,722,820 and their total compensation was \$239,632,975. Compared with the returns for the corresponding month of 1927, the number of employees shows a decrease of 64,949, or 3.63 per cent, of which 24,807 were in the maintenance of equipment and stores group, and 15,312 in the maintenance of way and structures group. The total compensation decreased \$9,261,684, or 3.72 per cent.

Great Northern Electrification and Tunnel Dedication

Electric operation of 76 miles of line of the Great Northern between Wenatchee, Wash., and Skykomish was begun on December 4. The entire 80 miles of the Wenatchee-Skykomish line, including the four-mile section between Berne, Wash., and Cascade tunnel, will be operated by electric locomotives when the tunnel is opened for traffic shortly after the first of the year. The new Cascade tunnel will be formally dedicated on January 12 when 40 radio stations in all parts of the United States will broadcast the dedicatory program for an hour at 9 p.m., Eastern standard time.

Kansas Flood

Train service on the St. Louis-San Francisco was interrupted on the line between Paola, Kan., and Fort Scott, between November 17 and 20, where there are three crossings of the Marais des Cygne river and two crossings of tributaries. This is the first trouble with high water on this line since the improvements that were made in 1916. The United States Weather Bureau station at Paola, Kan., reported a rainfall of 10.46 in. in 35 hrs. and the stage in the Marais des Cygnes was 4 ft. 4 in. higher than any

previous known stage. Five washouts, while not of great extent in mileage, were serious in interrupting traffic.

Physical property of the Atchison, Topeka & Santa Fe in Kansas was damaged to the extent of about \$135,000. In Missouri the Santa Fe estimated its damage to physical property at \$45,000.

Loading Rules Amended

The suggestions for changes in loading rules made by the Committee on Loading Rules at the regular annual meeting of the American Railway Association Mechanical Division at Atlantic City, N. J., June 20-27 inclusive, were ordered submitted to letter ballot, the returns of which are now available. The recommendations of the committee were divided into 31 propositions to amend the following loading rules of the division: Rules 3, 7, 126, 141-A, 201, 201-A, 202, 203, 216, 250-A, 250-B, 255, 260-A, 266, 301, 305-A, 306, 306-A, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 521, 561, 562, 563, 564 and 565. All of these propositions received the necessary two-thirds majority vote and have been approved by the American Railway Association, effective January 1, 1929.

Missouri Pacific Buys Arkansas Motor Coach Line

The Missouri Pacific Transportation Company, a highway and airway transportation subsidiary of the Missouri Pacific, has purchased the Smith Arkansas Traveler Bus Line, comprising about 600 miles of motor coach operations in Arkansas from Little Rock to Fort Smith, Bald Knob, Forrest City, McGehee, Hot Springs and El Dorado. An application for approval of the purchase, which is intended to become effective on January 1, was filed with the Arkansas Railroad Commission on December 2. The Missouri Pacific Transportation Company had previously asked permission of the Arkansas commission to enter the motor coach transportation field in Arkansas between points where motor coach lines parallel the railroad's right-of-way. If the sale is approved it is planned to purchase new equipment and improve that now in use.

(Continued on page 1156)

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1928

Name of road	Av. mileage operated during period	Operating revenues				Operating expenses				Operating ratio	Net from railway operation	Operating income (or loss)	Net operating income	Net operating income 1927
		Freight	Passenger	Total	(inc. misc.)	Way and structures	Maintenance of equipment	Traffic	Portation	General	Total			
Akron, Canton & Youngstown.....	Oct. 171	\$359,200	\$126	\$359,326		\$36,462	\$36,462	\$87,856	\$87,856	\$13,612	\$205,862	\$145,717	\$100,748	\$68,073
Albany, Troy & Saratoga.....	Oct. 171	2,846,771	2,327	2,849,098		51,566	51,566	127,551	127,551	140,667	1,080,582	939,035	629,599	503,540
Atchison, Topeka & Santa Fe.....	Oct. 9,430	18,391,934	2,453,135	20,845,069		2,536,817	2,536,817	3,253,994	3,253,994	4,115,034	12,286,164	8,453,164	6,635,508	6,635,508
Atlantic Coast Line.....	Oct. 9,428	127,815,956	29,433,844	157,249,800		30,176,962	30,176,962	3,998,867	3,998,867	4,115,034	120,426,925	37,159,845	36,985,362	37,277,774
Gulf, Colorado & Santa Fe.....	Oct. 1,944	2,806,572	173,852	3,149,031		290,986	290,986	58,286	58,286	71,075	1,620,252	1,346,320	1,267,867	975,164
Panhandle & Santa Fe.....	Oct. 1,944	19,436,780	1,971,132	21,407,912		3,898,611	3,898,611	557,401	557,401	708,635	16,772,813	4,989,181	3,715,997	4,653,755
Atlanta & West Point.....	Oct. 1,024	1,035,882	107,310	1,143,192		156,152	156,152	12,762	12,762	28,617	771,268	421,496	331,960	233,872
Western of Alabama.....	Oct. 1,023	8,959,719	1,072,744	10,032,463		2,490,802	2,490,802	121,495	121,495	276,787	8,000,517	2,803,540	1,574,000	2,043,573
Atlanta, Birmingham & Coast.....	Oct. 93	198,334	58,393	256,727		31,144	44,576	13,663	97,848	15,113	207,088	172,732	54,289	66,057
Atlantic Coast Line.....	Oct. 93	1,663,679	372,764	2,036,443		295,897	448,990	126,155	920,437	133,633	1,971,914	444,636	287,731	388,085
Atlantic Coast Line.....	Oct. 133	1,875,060	568,675	2,443,735		431,817	499,947	13,243	84,833	14,443	2,104,435	59,548	37,041	48,944
Atlanta, Birmingham & Coast.....	Oct. 133	1,875,060	568,675	2,443,735		431,817	499,947	13,243	84,833	14,443	2,104,435	59,548	37,041	48,944
Atlantic Coast Line.....	Oct. 133	1,875,060	568,675	2,443,735		431,817	499,947	13,243	84,833	14,443	2,104,435	59,548	37,041	48,944
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Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1928—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Operating income (or loss)	Net operating income, 1927
		Freight	Passenger (inc. misc.)	Total	Maintenance of way and structures	Equip. ment.	Traffic portation				
Chicago Great Western	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Chicago, Indianapolis & Louisville	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Chicago, Milwaukee, St. Paul & Pac.	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Chicago River & Indiana	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Chicago, Rock Island & Pacific	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Chicago, Rock Island & Gulf	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Chic., St. Paul, Minn. & Omaha	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Clinchfield Railroad	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Colorado & Southern	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Ft. Worth & Denver City	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Wichita Valley	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Columbus & Greenville	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Conemaugh & Black Lick	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Delaware & Hudson	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Delaware, Lackawanna & Western	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Denver & Rio Grande Western	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Denver & Salt Lake	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Detroit & Mackinac	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Detroit & Toledo Shore Line	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Detroit Terminal	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Detroit, Toledo & Iron Range	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Duluth & Iron Range	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Duluth, Missabe & Northern	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Duluth, Winnipeg & Pacific	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Elgin, Joliet & Eastern	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Erie Railroad	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Chicago & Erie	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
New Jersey & New York	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
N. Y., Susquehanna & Western	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
N. Y., Erie & Terre Haute	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Evansville, Indianap. & Terre Haute	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119
Florida East Coast	Oct. 1,495	\$2,170,007	\$226,435	\$2,396,442	\$414,296	\$84,612	\$952,865	71.7	\$1,837,119	\$558,646	\$1,837,119

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1928—CONTINUED

Name of road	Av. mileage operated during period.	Operating revenues			Operating expenses			Net from railway operation.	Operating income (or loss).	Net operating income.	Net operating income, 1927.			
		Freight.	Passenger (inc. misc.)	Total	Way and structures.	Maintenance of equip.	Traffic.					Trans- portation.	General.	Total.	Operating ratio.
Fort Smith & Western.....Oct.	249	174,567	11,439	193,630	\$25,015	\$32,943	\$7,427	\$49,222	\$7,314	\$121,010	62.5	\$72,620	\$34,954	\$26,269
Galveston Wharf.....Oct.	249	1,103,686	99,800	1,203,486	236,711	271,832	60,543	434,341	69,072	1,063,673	83.7	207,819	159,333	33,324
Galveston Wharf.....Oct.	13	.....	.....	261,308	3,698	3,911	3,161	39,141	5,405	113,493	43.4	147,815	122,997	35,939
Galveston Wharf.....Oct.	13	.....	.....	1,824,767	443,543	453,579	34,293	290,150	48,957	981,081	53.8	843,686	608,686	349,610
Georgia R. R. ....Oct.	328	423,440	54,798	515,715	55,398	85,498	22,901	188,162	24,173	375,467	72.8	140,248	134,828	118,538
Georgia & Florida.....Oct.	328	3,477,381	612,485	4,089,866	478,671	843,301	233,533	1,873,318	234,318	3,660,733	83.3	735,178	628,869	761,437
Georgia & Florida.....Oct.	445	1,216,996	117,749	1,334,745	29,410	22,376	8,957	55,991	8,540	124,852	87.6	17,705	10,829	16,019
Georgia & Florida.....Oct.	445	1,175,515	126,892	1,302,407	226,885	203,272	91,765	537,397	82,509	1,141,392	87.6	241,195	166,088	227,131
Grand Trunk Western.....Oct.	345	1,725,904	172,820	1,998,698	320,771	379,126	40,835	634,186	66,658	1,438,780	72.0	559,918	461,816	326,458
Atlantic & St. Lawrence.....Oct.	345	15,218,940	1,857,411	18,673,817	2,425,238	3,758,724	433,730	6,181,531	64,195	13,525,599	72.4	5,148,218	4,258,431	3,058,924
Atlantic & St. Lawrence.....Oct.	166	164,356	21,579	203,470	49,774	49,054	5,467	96,268	7,789	210,128	103.3	6,858	21,758	63,322
Atlantic & St. Lawrence.....Oct.	166	1,631,941	291,002	1,922,943	593,745	379,442	58,947	1,173,665	85,748	2,306,877	108.8	186,082	333,162	922,364
Chic., Det. & Canada Gr. Tr. ....Oct.	59	311,208	2,094	378,371	25,150	18,133	4,797	109,092	4,444	154,829	40.9	223,542	207,231	170,679
Detroit, Grand Haven & Mil.....Oct.	59	2,885,266	12,877	3,147,136	148,726	157,165	47,948	960,625	40,786	1,348,437	40.7	1,965,699	1,856,216	1,539,701
Detroit, Grand Haven & Mil.....Oct.	192	745,612	20,464	837,626	148,074	71,299	13,234	325,591	20,806	566,555	67.6	271,071	266,953	130,138
Detroit, Grand Haven & Mil.....Oct.	192	7,101,086	261,087	7,924,196	1,082,215	632,295	136,043	2,859,431	193,538	4,887,205	61.7	3,036,991	2,952,960	1,705,183
Great Northern.....Oct.	8,310	16,503,038	928,623	18,528,804	3,026,055	1,542,743	226,396	4,259,689	242,823	9,373,000	50.6	9,155,804	7,156,599	6,487,746
Green Bay & Western.....Oct.	8,250	85,438,599	9,709,981	104,554,992	15,633,729	15,611,073	2,397,404	32,520,370	2,361,578	69,243,420	66.2	35,311,572	26,823,281	22,908,286
Green Bay & Western.....Oct.	234	182,614	2,589	192,396	35,841	28,730	7,355	66,272	2,947	141,145	73.3	51,251	41,245	35,237
Green Bay & Western.....Oct.	234	1,351,671	50,347	1,472,027	250,222	207,133	56,540	556,451	28,021	1,096,335	74.6	373,692	285,471	236,842
Gulf & Ship Island.....Oct.	307	248,125	30,048	304,560	65,487	54,898	6,179	105,106	8,299	242,222	79.5	62,338	24,336	8,760
Gulf, Mobile & Northern.....Oct.	307	2,205,613	374,570	2,804,460	628,313	542,116	53,854	1,031,171	80,923	2,667,888	84.4	436,572	158,433	230
Gulf, Mobile & Northern.....Oct.	733	697,035	32,514	762,476	109,590	109,590	31,587	212,228	28,437	487,991	64.0	274,485	138,891	191,895
Gulf, Mobile & Northern.....Oct.	733	5,693,773	308,453	6,262,965	1,102,301	944,427	319,640	1,891,586	277,736	4,538,825	72.48	1,724,140	1,417,913	1,061,866
Hocking Valley.....Oct.	348	2,035,551	63,185	2,316,524	231,666	305,239	17,372	560,381	45,352	1,159,999	50.1	1,156,535	1,015,325	868,702
Illinois Central.....Oct.	348	15,236,695	603,990	17,437,764	1,930,241	3,252,677	167,628	4,849,622	453,221	10,653,199	61.1	6,784,565	5,550,827	4,660,378
Illinois Central.....Oct.	5,037	11,814,359	1,718,335	14,535,048	1,600,408	3,151,739	273,841	4,695,222	432,487	10,167,660	70.0	4,367,388	3,262,696	3,210,813
Illinois Central.....Oct.	4,994	99,910,278	17,965,677	127,203,121	15,279,363	30,083,531	2,609,775	45,048,441	3,575,306	97,409,680	76.6	29,793,441	21,256,870	21,241,572
Yazoo & Mississippi Valley.....Oct.	1,707	2,416,521	306,036	2,901,710	402,273	400,163	50,549	906,014	65,794	1,832,243	63.1	1,069,467	889,563	808,782
Illinois Central System.....Oct.	1,709	17,612,123	2,904,185	21,991,448	3,902,141	4,124,239	456,059	8,201,298	645,492	17,844,619	79.4	4,506,829	2,840,225	2,129,894
Illinois Central System.....Oct.	6,744	14,244,731	2,028,624	17,454,864	3,555,393	3,243,390	536,078	4,284,433	428,443	12,012,038	68.8	5,442,832	4,133,534	4,032,633
Illinois Central System.....Oct.	6,703	117,635,647	20,910,396	149,248,373	19,181,504	34,264,381	3,065,834	53,361,640	4,222,186	114,964,199	77.0	34,284,174	24,033,987	23,426,364
Kansas City, Mexico & Orient.....Oct.	272	191,638	5,839	206,415	58,681	44,705	8,899	75,243	7,899	195,427	94.7	10,988	6,800	26,835
Kansas City, Mex. & Orient of Tex.....Oct.	272	2,345,546	61,307	2,493,178	484,972	484,972	87,532	795,702	97,841	1,404,213	56.3	1,088,965	1,024,980	1,165,992
Kansas City, Mex. & Orient of Tex.....Oct.	465	415,107	12,678	440,599	16,322	73,898	9,426	106,559	10,359	214,637	48.7	225,962	218,587	173,546
Kansas City, Mex. & Orient of Tex.....Oct.	465	4,440,644	162,807	4,799,495	309,715	802,679	96,303	1,290,466	116,919	1,988,832	42.0	2,750,663	2,028,039	333,978
Kansas City Southern.....Oct.	784	1,449,665	87,130	1,710,474	187,928	257,172	58,680	494,121	77,917	1,075,295	62.9	635,179	552,349	492,831
Texasarkana & Ft. Smith.....Oct.	81	263,043	7,612	290,842	27,990	20,623	7,287	62,525	80,645	131,279	45.1	159,563	146,704	109,600
Kansas, Oklahoma & Gulf.....Oct.	325	333,648	3,907	344,485	72,842	39,893	11,774	61,505	9,633	195,345	56.7	149,140	139,217	122,068
Lake Superior & Ishpeming.....Oct.	326	2,559,270	30,850	2,642,301	652,846	257,075	111,583	641,568	100,699	1,653,175	62.6	989,126	862,710	729,498
Lake Superior & Ishpeming.....Oct.	160	285,159	802	330,271	36,048	25,471	65,190	65,190	5,804	133,050	40.3	197,221	162,644	159,459
Lake Superior & Ishpeming.....Oct.	160	1,954,655	14,806	2,260,713	378,233	261,219	5,317	515,986	87,954	1,486,671	55.2	1,012,042	774,926	737,456
Lake Terminal.....Oct.	13	.....	.....	113,785	15,336	17,873	.....	60,905	95,939	95,939	84.3	17,846	11,864	11,899
Lake Terminal.....Oct.	13	.....	.....	956,956	153,347	193,945	.....	525,871	19,081	892,244	93.2	64,712	17,061	46,907
Lehigh & Hudson River.....Oct.	96	272,625	1,370	283,611	27,851	31,647	2,558	85,772	9,954	157,756	55.6	125,855	107,337	87,193
Lehigh & Hudson River.....Oct.	96	2,204,864	15,504	2,327,660	245,516	335,597	25,405	837,194	98,691	1,942,403	66.3	785,257	635,254	427,468
Lehigh & New England.....Oct.	216	542,013	1,060	553,373	63,348	81,563	8,987	173,081	17,238	344,211	62.2	209,162	182,361	176,716
Lake Erie & Western.....Oct.	216	4,448,570	13,814	4,533,537	569,803	945,564	56,119	1,616,014	171,993	3,358,658	74.1	1,174,879	1,015,395	980,859
Lehigh Valley.....Oct.	1,364	6,412,756	500,884	7,399,025	302,586	1,326,634	135,907	2,639,042	134,608	4,767,840	64.4	2,631,185	2,033,129	1,894,167
Lehigh Valley.....Oct.	1,364	49,388,016	5,914,248	59,782,044	5,824,801	11,899,084	1,358,510	24,007,448	1,446,536	44,863,081	75.0	14,913,963	11,833,877	10,234,089
Louisiana & Arkansas.....Oct.	301	366,006	11,443	387,281	47,477	49,519	12,864	85,683	12,296	207,698	53.6	179,583	141,021	128,210
Louisiana Ry. & Nav. Co. ....Oct.	301	3,031,452	102,388	3,210,129	465,192	538,479	125,364	814,668	109,278	2,409,628	63.9	1,160,201	847,469	721,294
Louisiana Ry. & Nav. Co. ....Oct.	338	325,104	10,342	348,409	71,202	32,801	14,757	109,474	10,232	236,922	68.0	111,487	51,667	58,385
Louisiana Ry. & Nav. Co. ....Oct.	337	2,613,312	107,327	2,842,990	594,836	339,213	131,697	1,086,579	109,253	2,246,890	79.0	596,100	377,670	113,070
Louisiana Ry. & Nav. Co. of Tex.....Oct.	206	99,484	4,313	107,634	21,513	31,340	3,345	38,368	5,465	81,597	75.8	26,037	21,914	10,239
Louisiana Ry. & Nav. Co. of Tex.....Oct.	206	787,771	37,123	861,475	235,377	145,002	31,230	385,382	55,697	852,697	99.0	8,778	32,153	18,690
Louisville & Nashville.....Oct.	5,077	10,540,675	1,324,802	12,589,746	1,830,415	2,473,826	225,613	3,949,082	380,734	8,948,972	70.7	3,685,774	2,848,438	2,657,981
Louisville & Nashville.....Oct.	5,077	92,183,554	14,620,812	113,563,258	17,533,915	25,522,522	2,400,213	39,428,976	3,620,725	88,985,579	78.4	24,577,679	18,238,203	21,405,011

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1928—CONTINUED

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1928—(CONTINUED)													
Name of road	Av. mileage operated during per cent.	Operating revenues				Operating expenses				Operating ratio.	Net from railway operation.	Operating income (or loss).	Net operating income, 1927.
		Freight.	Passenger, (inc. misc.)	Total.	Maintenance of way and structures.	Traffic.	Transportation.	General.	Total.				
Louisville, Henderson & St. Louis.....Oct.	199	238,803	\$39,614	\$296,474	\$42,034	\$8,360	\$102,320	\$11,629	\$223,337	75.3	\$73,137	\$75,335	\$68,959
Louisville, Henderson & St. Louis.....10 mos.	199	2,129,835	421,253	2,727,334	510,021	85,705	1,016,346	117,352	2,233,163	81.8	491,171	366,803	305,305
Maine Central.....Oct.	1,122	1,367,854	213,561	1,739,110	206,938	19,871	639,036	51,428	1,267,955	72.9	3,658,572	2,551,170	2,309,292
Maine Central.....10 mos.	1,122	11,873,829	2,842,633	16,256,957	2,473,909	167,185	6,297,456	524,153	12,596,383	77.5	3,658,572	2,551,170	2,211,065
Midland Valley.....Oct.	364	342,955	13,223	366,262	57,832	8,135	77,024	13,413	198,347	54.2	167,915	155,369	144,627
Midland Valley.....10 mos.	364	2,889,819	153,689	3,136,243	465,783	78,087	766,926	127,899	1,784,521	56.8	1,353,722	1,204,045	936,969
Minneapolis & St. Louis.....Oct.	1,627	1,434,959	38,689	1,567,623	168,557	35,919	578,232	45,700	1,054,485	67.3	513,138	433,252	292,326
Minneapolis & St. Louis.....10 mos.	1,627	10,767,785	726,443	12,150,522	1,896,025	353,778	5,400,998	440,627	10,445,897	85.0	1,704,625	1,066,291	154,924
Minneapolis, St. Paul & S. Marie.....Oct.	4,385	5,588,664	344,419	6,301,823	708,453	88,064	1,773,431	118,191	3,430,997	54.4	2,870,826	2,393,495	2,137,281
Minneapolis, St. Paul & S. Marie.....10 mos.	4,385	34,667,008	4,293,735	42,120,970	5,872,104	807,335	15,222,421	1,181,780	30,665,210	72.8	11,457,187	8,957,922	7,441,301
Duluth, South Shore & Atlantic.....Oct.	578	3,323,163	597,756	4,304,075	810,995	78,411	1,792,115	10,870	3,552,018	81.8	782,057	452,031	288,838
Duluth, South Shore & Atlantic.....10 mos.	578	3,323,163	597,756	4,304,075	810,995	78,411	1,792,115	10,870	3,552,018	81.8	782,057	452,031	288,838
Spokane International.....Oct.	165	84,446	11,915	104,188	17,722	3,752	32,081	6,090	70,505	67.7	33,683	28,317	18,948
Spokane International.....10 mos.	165	840,914	106,540	1,018,289	164,618	35,405	320,062	63,420	686,679	67.4	331,610	276,558	206,186
Mississippi Central.....Oct.	161	1,293,376	76,353	1,417,631	218,810	94,964	375,154	79,463	994,589	70.1	423,040	331,873	316,092
Mississippi Central.....10 mos.	161	1,293,376	76,353	1,417,631	218,810	94,964	375,154	79,463	994,589	70.1	423,040	331,873	316,092
Missouri & North Arkansas.....Oct.	364	156,793	10,284	176,684	60,773	9,593	56,376	8,504	155,209	87.8	21,475	18,973	15,397
Missouri & North Arkansas.....10 mos.	364	1,187,982	111,864	1,385,251	345,999	194,714	555,507	83,354	1,276,597	92.1	108,654	82,512	35,418
Missouri-Kansas-Texas Lines.....Oct.	3,188	4,737,443	538,833	5,766,557	804,955	112,396	1,561,964	373,023	3,802,758	65.9	1,963,799	1,644,212	1,156,863
Missouri-Kansas-Texas Lines.....10 mos.	3,188	37,163,080	5,616,353	46,429,492	6,220,208	1,142,080	13,925,206	2,103,326	32,016,778	69.0	14,412,714	11,785,945	9,731,364
Missouri Pacific.....Oct.	7,460	10,932,534	1,111,037	13,107,431	2,136,317	311,615	4,221,760	380,508	9,278,121	70.8	3,829,310	3,261,152	2,740,768
Missouri Pacific.....10 mos.	7,441	89,183,730	11,389,812	109,365,309	17,647,069	2,970,999	37,657,505	3,735,698	82,416,343	75.4	26,948,966	22,306,944	17,923,403
Gulf Coast Lines.....Oct.	1,026	1,041,516	119,862	1,236,295	197,501	43,172	375,170	63,482	894,543	72.3	341,732	293,509	223,139
Gulf Coast Lines.....10 mos.	1,023	10,378,500	1,358,467	12,405,394	2,114,491	413,023	3,631,039	597,169	8,870,164	71.50	3,535,230	3,056,757	2,468,558
International-Great Northern.....Oct.	1,159	1,715,170	195,210	2,088,464	235,732	317,799	684,964	65,644	1,330,690	63.72	757,774	711,349	595,283
International-Great Northern.....10 mos.	1,159	12,442,590	1,832,080	15,593,769	2,408,615	2,570,627	6,135,238	671,062	12,114,454	77.69	3,479,315	3,051,568	2,256,104
San Antonio, Uvalde & Gulf.....Oct.	318	127,452	14,525	156,412	43,867	30,495	60,595	7,568	149,161	95.4	7,251	3,370	21,898
San Antonio, Uvalde & Gulf.....10 mos.	318	1,569,134	176,366	1,877,105	387,319	55,071	569,242	75,381	1,325,996	70.6	551,109	512,869	119,859
Texas & Pacific.....Oct.	2,015	4,095,934	501,256	4,924,317	866,121	92,385	1,353,478	118,462	3,103,155	63.0	1,821,162	1,626,809	1,403,842
Texas & Pacific.....10 mos.	2,015	34,224,232	4,917,375	41,614,353	6,620,039	6,535,782	13,147,693	1,118,380	28,231,790	67.8	13,382,562	11,491,935	8,547,425
Mobile & Ohio.....Oct.	1,159	1,503,353	92,758	1,683,834	208,351	49,520	547,019	42,232	1,114,818	66.2	569,016	414,896	377,372
Mobile & Ohio.....10 mos.	1,160	12,660,122	966,120	14,416,223	2,147,160	554,501	5,314,649	485,892	10,986,839	76.2	3,429,384	2,549,374	2,106,048
Monongahela.....Oct.	171	650,992	11,278	666,556	90,000	1,226	160,976	10,294	318,548	47.8	348,008	316,984	216,609
Monongahela.....10 mos.	171	5,778,157	148,585	5,973,119	815,000	11,139	1,509,000	105,765	3,182,878	53.3	2,790,241	2,558,096	1,599,779
Monongahela Connecting.....Oct.	7	.....	211,310	211,310	24,215	3,433	88,137	3,669	157,283	74.4	54,027	43,495	38,714
Monongahela Connecting.....10 mos.	7	.....	1,768,224	196,308	314,293	3,433	759,669	33,706	1,307,409	73.9	460,815	374,361	362,043
Montour.....Oct.	56	202,646	.....	203,673	26,242	1,336	44,515	7,639	140,584	69.0	63,089	61,533	30,584
Montour.....10 mos.	56	1,405,493	.....	1,413,494	234,885	12,300	318,629	68,970	1,072,305	75.9	341,189	326,078	267,137
Nashville, Chattanooga & St. Louis.....Oct.	1,259	1,838,991	268,983	2,286,667	222,394	68,791	689,565	7,427	1,497,267	65.5	789,400	651,369	441,123
Nashville, Chattanooga & St. Louis.....10 mos.	1,259	15,039,766	2,817,419	19,461,213	2,435,669	4,097,807	816,244	6,707,917	14,926,294	76.7	4,534,919	3,691,978	3,711,023
Nevada Northern.....Oct.	165	110,821	4,929	125,103	12,732	969	16,986	4,997	44,309	35.4	80,796	64,896	62,440
Nevada Northern.....10 mos.	165	787,200	52,432	923,693	103,304	9,628	151,781	44,910	426,173	46.1	497,520	376,245	369,587
Newburgh & South Shore.....Oct.	6	.....	.....	167,469	10,304	.....	64,695	6,591	116,302	69.5	48,194	32,229	42,851
Newburgh & South Shore.....10 mos.	6	.....	.....	1,750,532	172,607	.....	662,316	55,795	1,302,338	74.4	448,914	273,723	301,313
New Orleans Great Northern.....Oct.	276	278,560	17,656	305,415	37,979	12,560	87,101	11,832	192,933	63.2	112,482	93,771	71,355
New Orleans Great Northern.....10 mos.	276	2,441,787	196,122	2,723,983	377,223	131,889	832,925	113,054	1,882,394	69.1	841,589	670,048	469,233
New Orleans Terminal.....Oct.	20	1,661	.....	1,661	120,155	.....	21,273	1,401	47,716	39.7	72,439	62,431	59,278
New Orleans Terminal.....10 mos.	20	15,508	.....	1,387,715	230,880	.....	496,948	17,290	833,158	59.3	564,557	455,442	380,395
New York Central.....Oct.	6,906	23,661,333	7,540,792	35,886,233	4,971,075	431,315	12,017,220	1,040,643	26,456,953	73.7	9,429,280	6,930,500	7,035,311
New York Central.....10 mos.	6,906	196,044,078	81,130,599	318,509,413	42,788,872	4,526,879	110,204,695	11,238,737	241,002,288	75.7	77,507,125	55,340,786	53,460,050
Cincinnati Northern.....Oct.	244	372,035	4,078	388,691	46,196	6,131	118,045	109,348	241,524	71.1	980,130	747,056	93,253
Cincinnati Northern.....10 mos.	244	3,255,689	49,384	3,395,554	419,385	62,450	1,127,281	109,348	2,415,424	71.1	2,365,497	1,853,083	1,731,626
Cleve., Cinn., Chicago & St. Louis.....Oct.	2,396	6,451,106	1,189,561	8,363,373	958,911	156,098	2,811,735	292,855	5,998,076	71.7	2,365,497	1,853,083	1,731,626
Cleve., Cinn., Chicago & St. Louis.....10 mos.	2,396	56,303,360	12,231,034	74,968,838	8,457,366	1,525,707	27,587,691	2,690,941	57,048,921	76.1	17,919,171	13,889,899	11,779,182
Indiana Harbor Belt.....Oct.	130	.....	.....	1,250,083	109,391	447,299	19,307	722,406	57.8	527,677	448,443	387,289	
Indiana Harbor Belt.....10 mos.	130	.....	.....	10,641,819	1,087,063	4,684	4,058,922	256,242	6,719,030	63.1	3,922,789	3,274,977	2,776,292
Indiana Harbor Belt.....10 mos.	130	.....	.....	10,641,819	1,087,063	4,684	4,058,922	256,242	6,719,030	63.1	3,922,789	3,274,977	2,776,292
Michigan Central.....Oct.	1,858	6,400,537	1,474,763	8,767,152	1,004,114	133,896	2,535,281	187,472	5,597,523	63.9	3,169,629	2,542,162	2,429,687
Michigan Central.....10 mos.	1,858	54,220,008	16,579,695	78,469,145	8,579,854	1,307,569	24,529,242	2,115,680	52,718,373	67.2	25,750,172	20,385,429	18,138,073
Pittsburgh & Lake Erie.....Oct.	231	2,719,235	195,972	3,017,418	448,693	277,359	833,527	85,593	2,382,290	79.0	635,128	465,438	834,231
Pittsburgh & Lake Erie.....10 mos.	231	23,233,455	2,014,991	26,107,640	3,544,907	2,773,594	8,353,247	837,563	21,433,637	82.1	4,674,003	3,036,768	6,317,066
New York, Chicago & St. Louis.....Oct.	1,690	4,679,573	136,634	4,981,094	576,611	124,177	1,625,252	133,320	3,292,763	66.1	1,688,331	1,417,688	1,217,702
New York, Chicago & St. Louis.....10 mos.	1,690	41,288,351	1,535,062										

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1928—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues—Total				Operating expenses				Net from railway	Operating income (or loss)	Net ry. operating income, 1927
		Freight	Passenger (inc. misc.)	Maintenance of way and structures	Equip-ment	Traffic	Trans-portion	General	Total	Operating ratio		
N. Y., New Haven & Hartford.....Oct.	2,140	\$7,595,517	\$3,804,011	\$12,807,825	\$1,833,964	\$90,642	\$7,818,863	\$21,724	\$7,793,305	60.8	\$5,014,520	\$2,772,960
10 mos.	2,152	62,606,238	38,817,318	113,747,205	16,252,143	20,339,293	36,682,890	3,178,808	79,139,942	69.6	34,607,263	23,017,346
New York Connecting.....Oct.	20	256,601	.....	293,700	13,326	.....	39,689	1,520	84,491	28.8	209,209	148,896
10 mos.	20	2,037,236	.....	2,341,746	124,349	.....	428,894	16,779	826,323	35.3	1,515,423	1,005,844
New York, Ontario & Western.....Oct.	569	942,197	53,667	1,172,857	167,979	22,777	501,020	35,603	963,808	82.2	209,089	90,359
10 mos.	569	6,966,878	2,100,138	10,812,575	1,579,921	195,632	4,717,512	342,819	8,839,862	81.8	1,973,113	914,048
Norfolk & Western.....Oct.	2,241	9,941,511	4,215,288	10,703,838	1,480,235	113,672	2,384,816	245,491	5,994,285	56.0	4,709,553	3,290,667
10 mos.	2,241	79,810,872	4,805,075	87,667,142	13,247,523	1,126,018	22,046,343	2,538,903	55,342,831	63.1	32,324,311	27,053,766
Norfolk Southern.....Oct.	931	749,193	36,748	832,480	109,453	25,502	293,122	29,335	571,879	68.7	260,601	170,204
10 mos.	931	6,813,162	423,521	7,700,562	1,095,032	275,310	2,848,216	296,622	5,505,808	71.5	2,194,754	1,359,531
Northern Pacific.....Oct.	6,772	10,598,576	762,584	11,241,160	885,896	195,859	3,152,081	268,127	6,257,485	51.4	5,917,250	4,913,603
10 mos.	6,772	68,031,156	9,123,071	84,463,681	11,241,014	2,175,425	27,424,880	2,551,379	60,106,793	71.2	24,356,888	17,139,640
Northwestern Pacific.....Oct.	477	490,659	126,837	680,197	135,024	10,502	275,363	21,211	529,920	77.9	150,277	92,578
10 mos.	477	3,437,530	1,522,902	5,442,632	1,074,084	93,510	2,469,945	233,314	4,755,213	85.8	787,419	310,781
Pennsylvania R. R. ....Oct.	10,487	45,918,860	10,663,319	62,669,847	8,079,063	783,433	20,432,569	1,565,551	42,813,038	68.3	19,853,809	14,732,629
10 mos.	10,487	379,542,146	110,370,149	540,663,626	69,422,269	8,148,348	188,721,388	15,995,139	397,257,761	73.5	143,405,865	99,250,076
Baltimore, Chesapeake & Atlantic.....Oct.	130	91,061	24,645	125,948	13,095	1,864	75,979	819	105,394	83.7	20,554	15,247
10 mos.	130	786,096	290,469	1,154,858	132,809	19,955	736,221	21,261	1,389,490	120.3	234,632	284,491
Long Island.....Oct.	403	1,308,738	2,102,122	3,664,309	467,971	32,226	1,389,635	86,637	2,452,332	66.9	1,211,977	849,853
10 mos.	403	9,726,327	22,455,033	34,209,872	4,355,115	342,559	13,479,078	833,971	23,727,872	69.4	10,482,000	6,594,062
West Jersey & Seashore.....Oct.	370	468,571	295,017	813,696	128,038	5,226	345,397	16,352	618,642	76.0	195,054	159,294
10 mos.	370	4,042,125	4,613,101	9,104,257	1,299,728	132,938	3,963,036	231,765	6,913,150	75.9	2,191,107	881,044
Peoria & Pekin Union.....Oct.	19	30,983	1,938	150,806	30,084	5,217	69,832	8,254	132,945	88.2	17,861	29,895
10 mos.	19	267,891	17,417	1,606,649	188,871	36,593	672,081	75,874	1,119,344	69.7	487,305	535,463
Pere Marquette.....Oct.	2,244	4,373,869	199,094	4,833,039	434,334	67,094	1,388,683	106,453	2,812,477	58.2	2,020,562	1,587,503
10 mos.	2,244	33,608,182	2,559,536	38,421,167	7,627,951	647,013	12,423,420	1,093,380	26,118,753	58.0	12,302,414	8,965,353
Pittsburgh & Shawmut.....Oct.	102	152,687	2,124	157,805	34,111	2,048	44,403	7,724	124,943	79.2	32,862	40,176
10 mos.	102	1,526,639	36,376	1,585,783	224,099	18,401	440,275	68,473	1,091,988	68.9	493,795	372,501
Pittsburgh & West Virginia.....Oct.	92	431,188	4,841	470,343	31,352	16,601	75,627	28,371	254,192	54.0	216,151	154,213
10 mos.	92	3,375,860	53,091	3,753,496	243,866	153,637	674,826	206,027	2,097,497	55.9	1,655,999	1,266,957
Pittsburgh, Shawmut & Northern.....Oct.	186	155,423	1,525	161,879	43,588	1,617	52,282	5,723	137,891	83.2	23,991	18,606
10 mos.	186	1,553,395	18,778	1,606,519	353,365	16,824	504,723	59,160	1,245,963	77.5	360,556	250,809
Quincy, Omaha & Kansas City.....Oct.	249	54,612	7,950	69,903	8,373	802	30,020	2,312	74,216	106.2	4,313	9,132
10 mos.	249	464,325	87,569	618,688	322,913	7,959	282,836	24,660	720,667	116.5	101,979	150,574
Reading.....Oct.	1,136	8,057,529	613,248	9,188,968	1,123,953	90,238	2,946,779	195,277	6,082,397	66.2	3,106,571	2,743,412
10 mos.	1,136	63,410,193	6,529,206	73,883,848	10,112,884	885,199	27,374,396	2,114,723	57,089,150	78.1	16,174,698	12,332,866
Atlantic City.....Oct.	163	144,849	97,468	263,966	105,035	8,714	176,911	5,017	315,280	119.4	51,314	91,664
10 mos.	163	1,157,369	1,929,440	3,282,515	723,293	76,540	1,956,250	62,881	3,102,011	94.5	180,504	205,002
Perkmen.....Oct.	41	130,365	2,564	135,998	11,635	1,107	49,668	1,215	68,152	50.1	67,846	64,036
10 mos.	41	1,006,299	32,300	1,068,926	157,877	1,064	473,229	12,431	707,498	66.2	322,370	255,146
Port Reading.....Oct.	19	187,722	.....	277,438	23,717	229	87,432	3,376	129,301	46.6	148,137	134,258
10 mos.	19	1,426,489	.....	1,927,855	204,098	2,290	663,307	30,066	1,935,486	53.7	892,369	742,282
Richmond, Fredericksburg & Potomac.....Oct.	117	385,514	255,285	819,612	91,124	1,134	290,441	34,955	604,183	73.1	215,429	165,245
10 mos.	117	4,358,333	3,072,522	9,174,557	1,063,666	97,927	3,243,871	361,765	6,617,425	72.1	2,357,112	2,043,429
Rutland.....Oct.	413	340,912	83,876	560,165	102,727	11,937	208,319	17,274	442,612	79.0	117,553	87,296
10 mos.	413	2,708,082	1,099,682	5,671,813	1,411,346	115,497	2,094,219	160,225	4,345,387	80.1	1,126,326	886,113
St. Louis-San Francisco.....Oct.	5,312	6,322,196	936,660	7,904,660	991,128	2,410,109	2,427,729	5,043,910	2,823,038	63.1	2,860,750	2,596,006
10 mos.	5,312	53,499,680	9,655,720	68,644,841	8,659,083	12,500,901	22,685,032	2,322,104	47,639,905	69.40	21,004,936	17,106,384
Ft. Worth & Rio Grande.....Oct.	233	100,025	8,416	122,638	21,212	3,363	52,501	5,185	101,500	82.9	21,138	16,980
10 mos.	233	799,448	111,922	1,026,288	208,584	33,844	520,356	51,700	1,013,610	82.9	21,138	16,980
St. Louis, San Francisco & Texas.....Oct.	154	176,489	119,485	1,550,933	268,806	5,306	69,961	7,486	140,036	75.0	46,764	43,596
10 mos.	154	1,374,378	1,198,485	1,550,933	268,806	50,025	602,105	74,609	1,254,789	80.9	296,144	263,934
St. Louis Southwestern.....Oct.	940	1,689,045	83,901	1,859,222	195,427	72,160	420,827	69,758	1,018,827	54.8	840,395	709,064
10 mos.	940	13,502,942	83,342	15,026,427	1,966,136	686,008	3,916,562	650,323	9,613,567	61.2	5,426,402	4,705,599
St. Louis Southwestern of Texas.....Oct.	807	5,070,718	925,187	6,255,181	1,311,507	30,742	296,708	34,978	751,791	81.2	373,889	312,117
10 mos.	807	53,700,048	455,762	63,408,832	1,969,004	306,937	2,605,990	342,843	6,519,543	602.8	178,543	157,785
San Diego & Arizona.....Oct.	156	83,000	9,509	97,481	17,298	4,099	26,337	9,300	75,112	77.1	22,369	15,791
10 mos.	156	817,8	163,371	1,023,739	188,617	40,286	287,479	89,405	777,840	76.0	245,899	243,928
Seaboard Air Line.....Oct.	5,501	3,837,5	510,852	4,842,406	626,734	204,364	1,721,043	175,145	3,573,969	71.8	1,268,437	973,142
10 m. a.	5,501	79,337	6,585,492	47,182,278	5,536,898	1,999,265	17,689,466	1,824,719	35,229,392	75.3	11,652,886	8,146,439

Revenues and Expenses—TEN MONTHS OF CALENDAR YEAR 1900

MONTH OF OCTOBER AND YEAR									
Name of road	Av. mileage operated during period	Operating revenues		Operating expenses		Operating ratio	General	Total	Ratio
		Freight	Passenger (inc. misc.)	Way and equip. structures	Maintenance of equip. and structures				
Southern Ry.	6,730	\$10,520,094	\$1,787,007	\$13,412,973	\$2,988,582	28.22%	\$382,349	\$8,768,653	82.78%
Alabama Great Southern	314	6,364,331	1,475,247	8,405,982	1,647,805	25.79%	236,609	6,144,646	73.1%
Cinn., New Orleans & Florida	338	1,548,424	238,430	1,896,854	298,582	19.38%	53,209	1,259,636	66.4%
Georgia Southern & Northern	397	14,407,822	2,754,432	18,132,700	2,558,681	17.83%	147,283	12,653,539	87.7%
New Orleans & Northeastern	398	2,322,108	1,067,982	3,692,089	782,649	32.07%	27,705	649,891	27.9%
Cinn., New Orleans & Florida	204	424,953	59,422	521,325	64,769	15.29%	49,374	432,951	62.2%
Georgia Southern & Northern	110	3,575,070	687,725	4,579,786	809,984	22.62%	5,073,232	12,727,279	68.6%
New Orleans & Northeastern	110	100,042	66,505	925,056	246,535	24.57%	90,750	3,312,065	63.2%
Northern Alabama	110	831,691	1,067,982	2,521,325	64,769	25.67%	14,213	322,510	61.9%
Southern Pacific	8,897	17,325,383	2,969,493	22,143,499	2,297,187	13.03%	652,445	13,772,279	62.2%
So. Pacific Steamship Lines	8,906	134,748,365	32,692,237	184,355,378	23,164	15.72%	6,583,496	126,500,847	68.6%
Texas & New Orleans	4,728	5,870,391	934,160	7,606,653	1,251,973	21.36%	40,351	8,646,331	89.2%
Spokane, Portland & Seattle	554	44,484,955	9,090,840	58,989,238	1,771,235	3.26%	27,705	649,891	70.3%
Tennessee Central	296	276,077	18,040	308,871	38,999	12.62%	39,760	231,317	65.4%
Terminal Railroad Assn. of St. L.	367	2,402,978	197,272	2,734,974	100,901	3.66%	82,712	2,320,266	78.8%
Texas Mexican	28	128,508,331	24,251,113	152,559,444	16,714	1.07%	88,005	133,260	76.3%
Toledo, Peoria & Western	367	1,951,832	78,687	2,104,144	109,241	5.59%	82,712	1,718,582	88.5%
Toledo Terminal	28	128,508,331	24,251,113	152,559,444	16,714	1.07%	88,005	133,260	76.3%
Trinity & Brazos Valley	128	40,254	6,380	46,724	1,038,996	2.44%	44,010	4,322	90.3%
Ulster & Delaware	45	1,173,776	147,755,547	1,321,521	158,739	12.79%	14,239	1,217,292	72.1%
Union Railroad of Penna.	3,765	80,910,529	12,757,121	93,667,650	18,485	1.97%	1,829,147	1,921,008	80.0%
Union Pacific	2,539	3,849,539	286,984	4,136,523	80,810	1.94%	9,006,106	16,591,008	56.3%
Oregon Short Line	2,539	26,464,553	3,555,698	30,020,251	51,963	0.17%	73,354	2,939,922	72.7%
Los Angeles & Salt Lake	258	409,356	118,205	527,561	38,432	7.28%	1,014,217	136,040	64.3%
St. Joseph & Grand Island	258	3,108,774	1,363,971	4,472,745	765,889	17.12%	9,006,106	1,811,008	72.2%
Utah	545	1,610,819	25,591	1,636,410	34,534	2.14%	151,038	1,485,372	91.5%
Virginia	2,524	5,706,066	6,054,490	11,760,556	14,008	0.12%	335,064	34,016	47.8%
Wabash	293	509,066	17,558	526,624	14,008	2.67%	335,064	34,016	47.8%
Ann Arbor	293	4,551,845	21,737	4,573,582	14,008	0.31%	335,064	34,016	47.8%
Western Maryland	1,050	2,012,016	119,322	2,131,338	14,008	0.66%	335,064	34,016	47.8%
Western Pacific	1,050	12,098,092	1,355,397	13,453,489	14,008	0.10%	335,064	34,016	47.8%
Wheeling & Lake Erie	168	112,411	821,359	933,770	14,008	1.51%	335,064	34,016	47.8%
Wichita Falls & Southern	168	112,411	821,359	933,770	14,008	1.51%	335,064	34,016	47.8%

News Of The Week

(Continued from page 1149)

Acquisition of Express Business

The activities of the railroads in the direction of acquiring the business of the American Railway Express Company have progressed to the point where a committee went this week to Washington to see about securing the approval of the Interstate Commerce Commission. Control of the Adams and American Express Companies (which own the American Railway Express) by a "railroad banking group" was announced in New York on Tuesday and the shares of both Adams and American rose to high prices in Wall Street. The Railway Express Agency, Inc., which has been formed by the railroads proposes to take over such portions of the American Railway Express plant as are located on railroad ground; nothing is said about actual purchase of the company and its charter. M. J. Alger, executive assistant to president of New York Central, has become a director of the Adams Express Company as has also William T. Hoops, president of the company, which controls the L.C.L. freight containers. These men have also become directors of the American Express Company.

New York State Grade Crossings

One hundred and thirty-nine additional projects, involving the elimination of 246 additional grade crossings have been designated by the New York State Public Service Commission for consideration during 1929. The total estimated cost of these proposed eliminations is \$31,123,700, of which the State's share will be \$12,449,480; the counties wherein the crossings are located, \$3,112,370; and that of the railroad corporations, \$15,561,850.

There have also been designated for consideration in 1929, six projects, wholly or partly in Buffalo, involving twelve grade crossings, at an estimated cost of \$8,755,000. The commission will soon start hearings in each individual elimination project to be considered in 1929, for consideration of the best method of eliminating the existing grade crossings, or for closing the proceedings if no necessity exists.

There are also continued on the 1929 program 33 elimination projects, involving 54 crossings, which have been under consideration on the 1928 program but upon which no determination has been made. The total estimated cost of these projects is \$8,391,000. Determination will be made by the Commission in at least one-half of the projects within six weeks.

The Commission also designated ten crossings, wholly or partly in Buffalo, elimination of which will be considered in 1929, suggested by the Buffalo Grade Crossing Commission. Of the total estimated cost of these, \$4,377,500 will have to be borne by the railroads.

The projects on the 1929 program involve 20 railroads, and the railroads' share of the cost is estimated at \$15,561,850. There are 41 projects on the New York Central with the railroad's share of the estimated cost \$5,173,500; the Delaware & Hudson, 19, share of cost \$1,176,400; Erie,

19, share of cost \$1,491,400; Lehigh Valley, 13, share of cost \$1,185,500 and Long Island, 12, share of cost \$3,436,500.

Oppose One-Term Limit for I. C. C.

Fearing that an effort may be made by the next session of Congress to fix the terms of Interstate Commerce Commissioners so as to prevent their reappointment to office, the Merchants' Association of New York has taken action in opposition to such a proposal. A bill which would have fixed the term of commissioners at eight years and made them ineligible for reappointment was introduced in the last Congress by Senator Neely of West Virginia. It was not passed. In view of the likelihood the subject will be brought up again at the next session of Congress, the association made a study of the question through its Committee on Transportation, of which R. S. Stubbs, vice-president of the American Sugar Refining Company, is chairman.

The committee concluded that inasmuch as several years must elapse before a new commissioner can become acquainted with subjects referred to the Interstate Commerce Commission for decision, those who have served for several terms are of much greater value to the public than new men appointed from time to time with no special knowledge of the work. In fact, members of the committee felt that, other things being equal, the longer a man serves on the Interstate Commerce Commission, the better fitted he is for his task. The committee also pointed out that the appointment of new men throws a heavy burden on the other commissioners while the new incumbents are familiarizing themselves with their jobs.

In announcing its decision, the Merchants' Association added that the passage of the bill would "certainly affect not only the work of the Commission, but would make it impossible to secure the type of men which the shippers are now urging the President to appoint."

In view of the fact that the terms of three commissioners expire during the calendar year, the Association announces that it "will take such steps as it may deem appropriate to defeat any attempt to change the law so as to prevent their reappointment."

The Canadian Roads in October

Substantial increases in gross earnings and net earnings are shown in the financial statement of the Canadian National for October and the ten-month period from January to October inclusive.

For the month of October the gross earnings amounted to \$30,154,743, in comparison with gross earnings of \$24,787,721 for October, 1927, an increase of \$5,367,021 or 21.65 per cent. In October operating expenses totaled \$19,831,429 as against \$17,203,107 in October, 1927, an increase of \$2,628,321 or 15.28 per cent.

The operating net for October thus amounted to \$10,323,313, which compared with \$7,584,614 in October, 1927, an increase in favor of the month of October of this year of \$2,738,699, equivalent to 36.11 per cent.

The ten-month period from January to

October inclusive shows gross earnings totalling \$226,472,565. In the similar ten-month period of 1927 the gross earnings amounted to \$202,807,307, an increase for the current year of \$23,665,257, or 11.67 per cent. Operating expenses for the ten-months of 1928 amounted to \$180,062,454 as against \$168,220,352 in the first ten months of 1927, an increase of \$11,842,101 or 7.04 per cent.

Net earnings for ten months of 1928 amount to \$46,410,110, which compares with \$34,586,955 for the first ten months of 1927, an increase of 34 per cent or \$11,823,155.

As a result, the operating ratio for the ten-month period of 1928 has reduced to 79.51 per cent from 82.95 per cent for the similar period of 1927.

For the month of October operating net of the Canadian Pacific was the highest for any month in the history of the company, standing at \$10,006,279, as compared with \$6,971,365 in October of last year, representing an increase of \$3,034,913. Gross revenues were \$27,020,332, compared with \$21,201,713 in October of last year, an increase of \$5,818,618. By the same comparison, operating expenses increased by only \$2,783,704.

For the ten-month period ended with October, both gross and net are shown a record totals. Gross earnings for the ten-month period amounted to \$183,588,531, as compared with \$160,384,749 in the corresponding period of last year, an increase of \$23,203,781, while net for the ten-month period was \$41,231,568, comparing with \$31,466,611, an increase of \$9,764,957.

Roads Ask Amendment of Consolidation Bill

Amendments to the Parker railway consolidation bill, which was reported to the House last April by the committee on interstate and foreign commerce, were urged by members of a committee of the Association of Railway Executives at a hearing before the committee on December 4. The principal amendment asked was the removal of a provision in paragraph 2 of section 202 of the bill which would prohibit a railroad from acquiring securities of or any interest in another carrier, short of control, without the approval of the commission as a part of a plan for unification.

Chairman Parker of the committee has stated that efforts would be made to ascertain whether the Senate is likely to take up the bill at the short session of Congress which began on December 3 and that if it is, an effort will be made to pass the bill through the House, but that if it appears the Senate is not ready to act at this session, time for debate on the bill in the House probably will not be taken.

Testimony in support of the amendment was given by Alfred P. Thom, general counsel of the Association of Railway Executives, H. W. Clark, vice-president and general counsel of the Union Pacific, A. H. Harris, vice-president of the New York Central, and R. S. Lovett, chairman of the board of the Union Pacific; while R. C. Fulbright, chairman of the legislative committee of the National Industrial Traffic League, also appeared in support

of it, saying that while the shippers desire a prohibition against the acquisition of control without the approval of the Interstate Commerce Commission they do not wish it applied to any purchase of stock. Mr. Thom told the committee that while the bill now prohibits such acquisition without the approval of the commission, there is no provision in the bill for approval by the commission except in connection with a unification plan. He and the other speakers, showed how the provision would prevent a road now having control of another from buying additional stock or participating in an increase of stock. After many questions by members of the committee as to why a railroad should be allowed to invest in securities of another, Judge Lovett pointed out that the roads are not asking for any power which they do not now have under state laws or charters, but are asking Congress not to impose an additional restriction in a bill which should be concerned only with unification. Mr. Thom urged the importance of consolidation legislation to enable the railroads to readjust themselves to the changing economic conditions confronting them, as a result of which they are losing passenger traffic and short-haul and l.c.l. freight, although their long-haul carload traffic is increasing. He also said that one of the greatest problems of the railroads is as to how to agree on harmonious policies and that this would be simplified if the roads were combined into a smaller number of systems.

The representatives of the railroads also conferred on December 5 with Senator Fess, chairman of the sub-committee of the Senate committee on interstate commerce to which was delegated consideration of the Fess consolidation bill, which is similar to the Parker bill. They urged consideration of the same amendments which had been proposed the day before at the hearing before the House committee and that efforts be made to have the Fess bill reported to the Senate at this session.

Revenues and Expenses for October

The net railway operating income of the Class I railroads in October amounted to \$166,311,162, which, for that month, was at the annual rate of return of 5.83 per cent on their property investment, according to reports compiled by the Bureau of Railway Economics. In October, 1927, the net railway operating income was \$134,040,214, or 4.85 per cent. Operating revenues amounted to \$617,782,406, compared with \$581,006,228 in October, 1927, or an increase of 6.3 per cent. Operating expenses totaled \$401,159,687, compared with \$399,841,398 in the same month in 1927, or an increase of three-tenths of one per cent.

Class I railroads in October paid \$39,082,169 in taxes, an increase of 7.4 per cent over the same month in 1927. This brought their total tax bill for the first ten months in 1928 to \$324,653,800, an increase of \$777,047 or two-tenths of one per cent above that of the corresponding period in 1927.

Nine Class I railroads operated at a loss in October, of which six were in the Eastern district, one in the Southern and two of the Western.

For the first ten months in 1928 the net railway operating income was \$986,144,837 at the rate of 4.73 per cent. During the corresponding period of the preceding year, the net amounted to \$944,017,103, or 4.64 per cent.

Operating revenues for the ten months amounted to \$5,151,980,026, a decrease of 1.7 per cent. Operating expenses totaled \$3,742,250,935, a decrease of 3.4 per cent.

Net railway operating income by districts for the first ten months with the percentage of return based on property investment on an annual basis, was as follows:

New England Region.....	\$36,020,568	4.64%
Great Lakes Region.....	173,105,564	4.85%
Central Eastern Region.....	216,423,630	4.95%
Poconos Region.....	63,992,757	7.32%
Total Eastern Dist.....	489,542,519	5.10%
Total Southern Dist.....	108,592,106	4.19%
Northwestern Region.....	122,403,347	4.35%
Centralwestern Region.....	178,713,692	4.50%
Southwestern Region.....	86,893,173	4.66%
Total Western District.....	388,010,212	4.48%
United States.....	986,144,837	4.73%

The net railway operating income of the Class I railroads in the Eastern District for ten months totaled \$489,542,519, at the rate of 5.10 per cent, as compared with \$482,954,207 or 5.15 per cent, last year. Operating revenues totaled \$2,526,609,633, a decrease of 3.4 per cent, while operating expenses totaled \$1,838,976,759, a decrease of 5 per cent. For October they had a net railway operating income of \$74,511,773 compared with \$54,935,532 in October 1927.

Class I railroads in the Southern District for the ten months had a net of \$108,592,106, at the rate of 4.19 per cent, as compared with \$118,675,353, at the rate of 4.71 per cent, last year. Operating revenues amounted to \$644,097,236, a decrease of 6.3 per cent, while operating expenses totaled \$488,551,326, a decrease of 5.9 per cent. Their net in October totaled \$16,342,738, while in the same month in 1927 it was \$13,956,946.

Class I railroads in the Western District for the first ten months in 1928 had a net railway operating income of \$388,010,212, at the rate of 4.48 per cent. For the first ten months in 1927 they had a net of \$342,387,543, at the rate of 4.05 per cent. Operating revenues of the Class I railroads in the Western District for the ten months amounted to \$1,981,273,157, an increase of 2.2 per cent, while operating expenses totaled \$1,414,722,850, a decrease of four-tenths of one per cent. For October the net in the Western District amounted to \$75,456,651. The net railway operating income of the same roads in October, 1927, totaled \$65,147,736.

CLASS I RAILROADS—UNITED STATES

	Month of October 1928	1927
Total operating revenues.....	\$617,782,406	\$581,006,228
Total operating expenses.....	401,159,687	399,841,398
Taxes.....	39,082,169	36,398,735
Net railway operating income.....	166,311,162	134,040,214
Operating ratio—per cent.....	64.94	68.82
Rate of return on property investment.....	5.88%	4.85%
Ten months ended October 31st		
Total operating revenues.....	\$5,151,980,026	\$5,239,430,243
Total operating expenses.....	3,742,250,935	3,874,960,125
Taxes.....	324,653,800	323,876,753
Net railway operating income.....	986,144,837	944,017,103
Operating ratio—per cent.....	72.64	73.96
Rate of return on property investment.....	4.73%	4.64%

Foreign

An English Railway Museum

The London & North Eastern of Great Britain has established a museum at York, England, and has placed in it several records and relics tracing the progress of railways during the past century. These exhibits include old locomotives arranged to indicate the evolution of motive power, primitive signaling arrangements, early passenger cars, the first iron railway bridge and old timetables and tickets.

British Roads Seek Air Transport Powers

Air transport powers are being sought in the present session of Parliament by the four principal railway companies of Great Britain. For this purpose each of the four roads which are the London, Midland & Scottish, the London & North Eastern, the Great Western and the Southern, has filed a separate bill seeking the charter extension.

These four bills are identical and then enactment would grant broad powers in the air transport field such as authority to own and operate aircraft and to convey thereon traffic of any description, and to provide air transport services; to establish and operate airdromes and to carry on any business subsidiary or ancillary thereto; to acquire lands; to provide, erect and operate all such hangars, garages, repair shops, refreshment rooms, appliances, equipment, conveniences, etc., as may be desirable; to demand and take fares, rates and charges in respect to traffic conveyed, services rendered and facilities afforded, and in respect to airdromes; to make and enforce by-laws; to enter into and carry into effect agreements with any company, body or person for the provision and working of aircraft and airdromes, interchange of traffic, etc.; to provide funds and to hold stock, shares and securities for the purpose of any such agreement and to guarantee the dividends and interest thereon; and to apply its funds to air transport purposes.

These British railways were recently successful in securing the passage, by Parliament, of bills extending their charter rights to permit the operation of motor vehicles on the highways and are now engaged in organizing road services on several routes.

Railways of India

Gross revenues equivalent to \$437,420,000 and operating expenses equivalent to \$267,501,000 were reported by all railways of India for the year ending March 31, 1928, according to the preliminary statistical abstract issued by the Indian Railway Board. Composite net earnings from operations during the year were therefore approximately \$169,919,000.

The foregoing figures compare with gross revenues of \$415,719,000, operating expenses of \$251,233,000 and net earnings from operations of \$157,826,000 during the year ending March 31, 1927. The composite operating ratio fell from 62.04 per

cent in 1926-27 to 61.16 per cent in 1927-28, thus increasing the percentage of net earnings to total capital from 5.41 in the previous year to 5.58 in 1927-28.

During the year under review the capital invested in all lines rose from \$2,918,066,000 to \$3,044,591,000 and about 1,700 miles of new line were opened, bringing the total route mileage on March 31, 1928, to 39,711 and the track mileage to 53,846. In addition the report lists 2,424 route miles as being under construction and another 1,040 route miles as authorized.

Indian railways are grouped according to total revenues in one of three classes. Class I roads are those with annual gross revenues of 50,000,000 rupees or about \$18,500,000 while those reporting earnings of less than 50,000,000 but more than 10,000,000 rupees (\$3,700,000) are in Class II with all others in Class III. Class I roads in 1927-28 reported total gross revenues equivalent to \$423,152,700, expenses of \$258,432,000 and this accounted for \$164,720,670 of the total of \$169,919,000 reported as the total net earnings of all roads. These large roads in 1926-27 reported gross revenues of \$402,279,540, expenses of \$248,941,550 and net earnings of \$153,337,990.

Class II roads in 1927-28 reported gross revenues of \$11,801,800, expenses of \$7,294,920 and earnings from operations of \$4,506,970 while respective figures for Class III lines were \$2,465,600, \$1,774,000 and \$691,500. The Class II group increased its composite net earnings over those of 1926-27 while the Class III total dropped about \$6,300.

Segregating the state operated and controlled lines from the foregoing groups, the report reveals that the governmental properties on March 31, 1928, involved a total capital cost of \$2,696,849,000; they reported \$375,479,600 of the total \$437,420,200 gross revenues of all roads and earned \$145,707,000 of the \$169,919,000 total net earnings from operations. Thus railways other than those operated or controlled by the state reported during the year total gross revenues equivalent to \$51,491,000, expenses of \$27,280,000 and net from operations of \$24,210,950. Capital invested in these non-governmental lines totaled \$322,362,500 on March 31, 1928.

During the year 1927-28 623,114,800 passengers were carried by all railways, 594,821,200 being third class travelers. These figures compare respectively with 604,371,700 and 578,408,600 for the previous year. Passenger miles rose in comparison with the previous year from 20,366,250,000 to 21,704,290,000 while the average journey per passenger increased from 33.7 to 34.8 miles. Gross passenger revenues in 1927-28 were \$144,964,500 as against \$141,038,400 for the previous year.

In freight operations 21,902,222,000 long ton miles were produced on 89,791,000 long tons hauled, an average of 243.9 miles each. In the previous year total long tons carried amounted to 85,833,000, long ton mile production was 20,374,679,000 while the average haul was 237.4. Earnings from freight traffic were \$256,779,600 in 1927-28 as against a comparable figure of \$240,806,300 for 1926-27.

Traffic

The Transportation Club of Peoria, Ill., will hold its seventeenth annual dinner at the Pere Marquette Hotel, Peoria, on December 18. J. E. Gorman, president of the Chicago, Rock Island & Pacific and J. Heber Hudson, director of the organization service department of the Illinois Chamber of Commerce, will be the principal speakers.

The Erie has been authorized by the New York State Public Service Commission to discontinue the services of an agent at Conesus, Livingston county. Differing slightly from numerous other orders of this kind recently issued by the commission, it is stipulated that the caretaker, who is to keep the station open for the use of passengers during certain parts of the day, will also be required to act for the governing agent (who is at Websters) to the extent of issuing bills of lading, receiving and collecting freight charges and handling express matter.

Business in Chicago Territory Good

General business prosperity in the Chicago territory and the middle west at large is reflected in the heavy movement of freight from local freight platforms in recent months, which reached a new record in October when 255,728 cars were loaded and sent out, as compared with 224,959 cars in September and 244,517 cars in August. According to the records since 1923, the October figure is the largest monthly total for any month. For the period from January 1 to October 31, a total of 2,325,239 cars were loaded in Chicago, which is a new record, comparing with 1,742,716 cars during the same period of 1923, 1,761,885 cars in 1924, 2,106,763 cars in 1925, 2,227,828 in 1926 and 2,130,030 in 1927.

According to the Chicago Association of Commerce, which has just completed a study of business in and around Chicago, the monthly records in 1928 have been uniformly better than those of any period in the past six years, the only exceptions being March and June when shipments were slightly behind the previous high marks.

Auxiliary Trucking Service on Manhattan Island Recommended

The Interstate Commerce Commission on November 30 made public a proposed report, prepared by Examiner Harry C. Ames, on the investigation instituted by the commission into constructive and off-track railroad freight stations on Manhattan Island, New York City, and also an investigation and suspension proceeding, "Constructive Stations and Trucking in Lieu of Lighterage" in New York city and vicinity.

The report recommends a finding that the commission is without power under the interstate commerce act to require

carriers to establish store-door delivery, inland stations for the receipt and delivery of freight, or to equip themselves with motor trucks. The examiner says, however, that the commission should strongly urge upon the carriers the establishment of auxiliary trucking service in Manhattan to the end that it may ultimately pave the way for discontinuance of the more expensive car-float and pier-station service; and that it should also consider a recommendation to Congress with the view of securing legislation broadening its jurisdiction over terminal facilities to such an extent that it would be empowered, on a showing of public convenience and necessity, to require a carrier by railroad to equip itself with motor trucks and erect and locate the necessary station facilities to be served thereby. The commission, through its representatives, he also says, should hold itself in readiness to co-operate to the fullest extent practicable with the carriers and shipping public in the formulation of corrective terminal measures on Manhattan Island.

Other specific recommendations are:

That the present operation of constructive-station service and of trucking in lieu of lighterage as practiced by the New York Central, Central of New Jersey and Baltimore & Ohio can not be sanctioned because of their plain tendency to create violations of sections 2 or 3 of the act, and because said services, as now operated, are not compatible with the provisions of section 15a of the act.

That respondents in I. & S. No. 3100 should be permitted to discontinue the present constructive-station service and to limit the practice of trucking in lieu of lighterage to the interchange of traffic between connecting railroad and steamship lines, as proposed.

That the constructive station now maintained by the New York, New Haven & Hartford should be discontinued because it is in violation of section 2 of the act; and the proposal of the New York Central to continue the practice of constructive lighterage on traffic to and from New England, in order to meet the competition of the said constructive station, should also be denied.

The "constructive station" experiment has been going on for seven years. The Erie was the first road to try it, in November, 1921, because of great congestion and lack of adequate terminal facilities. The next was the Lehigh Valley, in December, 1924; and only when it was losing traffic to the Erie. The Delaware, Lackawanna & Western was next to establish constructive stations, in April, 1925, to meet the competition of the Lehigh Valley and the Erie. In September, 1926, the New Haven established its first constructive station hoping to develop it to an extent which would permit the elimination of the more costly pier service. It is not proposing, as are all the others, to discontinue the service. The Baltimore & Ohio established its stations in March, 1927, partly because of the competition of other lines and partly because of desire to experiment with it, while the stations of the Pennsylvania were established in

June, 1927. Those of the Central New Jersey came soon after, solely as a competitive measure.

Charges for Accessorial Services at Ports

The Interstate Commerce Commission on December 5 made public a proposed report by Attorney-Examiner R. N. Trezise on the investigation undertaken by the commission into the charges for wharfage, handling, storage and other accessorial services at Atlantic and Gulf ports, recommending that the commission find as follows:

1. That the rail-water terminal facilities at north Atlantic, south Atlantic and Gulf ports are not shown to be insufficient or inadequate to accommodate the export, import, coastwise and intercoastal traffic offered for movement through those ports, but on the contrary, existing facilities are shown, on the whole, to be reasonably adequate to meet normal traffic needs.

2. That the practice of absorbing terminal charges on traffic passing over municipal facilities and refusing to absorb on like traffic over similarly circumstanced private facilities is unduly prejudicial to the private facilities and unduly preferential of the municipal facilities.

3. That the record in the present case is insufficient to establish that the charges on the traffic under consideration are so low as to impose a burden upon other traffic.

4. That the accessorial or terminal costs prepared under a uniform formula as shown on this record at north Atlantic ports is sufficient upon which to compare the average costs at the north Atlantic ports, but with consideration to be given to the fact that those costs are relatively higher for comparative purposes at ports where the facilities are used only to a limited extent than at ports where the facilities are used extensively.

5. That the accessorial or terminal costs as shown on this record at south Atlantic and Gulf ports prepared upon varying formula are not comparable with other port costs shown on this record.

6. That the record does not warrant the prescription of a tariff rule requiring the accessorial or terminal charges to be stated separately from the line-haul rates on export, import, coast-wise, and intercoastal traffic to and from Atlantic and Gulf ports.

7. That the practice of leasing warehouses, or portions thereof, to large shippers for periods of less than a year, covering a storage season, at charges less than those named in the published tariffs, while contemporaneously charging the tariff rates to other shippers for a like service is unduly prejudicial to small shippers and unduly prejudicial of the larger shippers, and is in the nature of a rebate to the larger shippers.

8. That the practice of leasing warehouses for inadequate rentals, especially when greater revenues could be obtained under the application of the tariff rates is a reflection on the efficiency and economy of the railroad management.

Equipment and Supplies

Locomotives

THE MISSOURI PACIFIC is inquiring for 25 eight-wheel switching locomotives.

THE CHICAGO & NORTH WESTERN is inquiring for 10 locomotives of the 4-8-4 type.

THE LOUISVILLE & NASHVILLE is inquiring for 24 Mikado type locomotives. This company was reported in the *Railway Age* of November 24, as having authorized the purchase of this equipment.

Freight Cars

THE UTAH COPPER COMPANY is inquiring for 100 ore cars of 90 tons' capacity and 20 dump cars of 30 cu. yd. capacity.

THE CHICAGO GREAT WESTERN is inquiring for 300 automobile cars and 200 box cars.

THE NEW YORK CENTRAL is inquiring for 100 all steel high side gondola cars, of 70 tons' capacity.

THE YOUNGSTOWN SHEET & TUBE COMPANY has ordered 17 air dump cars of 35 cu. yd. capacity, from the Koppel Industrial Car & Equipment Company.

THE ANTORG TRADING CORPORATION has ordered 20 air dump cars of 20 cubic yards capacity from the Magor Car Corporation.

THE SEABOARD AIR LINE has ordered 200 all steel hopper cars from the Richmond Car Works. Inquiry for this equipment was reported in the *Railway Age* of November 24.

THE LEHIGH VALLEY is inquiring for 200 mill type gondola cars of 70 tons' capacity, 500 hopper cars of 70 tons' capacity, and 300 automobile box cars of 40 tons' capacity.

THE RICHARDSON REFINING COMPANY, Fort Worth, Tex., has ordered 200 tank cars of 8000 gal. capacity, from the General American Tank Car Corporation. Inquiry for this equipment was reported in the *Railway Age* of November 3.

THE LOUISVILLE & NASHVILLE is inquiring for 1200 gondola cars of 50 tons' capacity, 40-ft. 6-in. long; 250 mill type gondola cars of 70 tons' capacity and 45-ft. long; 750 single sheathed automobile cars of 50 tons' capacity and 300 single sheathed box cars of 50 tons' capacity. This company was reported in the *Railway Age* of November 24 as having authorized the purchase of this equipment.

THE MISSOURI PACIFIC is inquiring for 1000 box cars of 50 tons' capacity, 40-ft. 6-in. long; 750 automobile cars of 40 tons' capacity, 40-ft. 6-in. long; 250 automobile cars of 50 tons' capacity, 50-ft. 6-in. long;

500 hopper cars of 70 tons' capacity; 500 stock cars, 20 dump cars of 20 cu. yd. capacity; 60 caboose cars; 100 of the 50 ton automobile and 250 of the 40 ton automobile cars are to be equipped with end doors.

THE ATCHISON, TOPEKA & SANTA FE has authorized the purchase of the following equipment:

2,000 box cars of 50 tons' capacity
500 single deck stock cars of 40 tons' capacity
250 double deck stock cars
450 gondola cars of 50 tons' capacity
250 mill type gondola cars of 70 tons' capacity
150 hopper cars of 50 tons' capacity
150 sulphur cars of 70 tons' capacity
500 refrigerator cars of 40 tons' capacity
200 flat cars of 50 tons' capacity
125 caboose cars.

Of these, inquiries have been issued for:

500 single deck stock cars of 40 tons' capacity
250 double deck stock cars
150 sulphur cars of 70 tons' capacity
500 refrigerator cars of 40 tons' capacity
200 flat cars of 50 tons' capacity
125 caboose cars.

Passenger Cars

THE BOSTON & MAINE is inquiring for 10 baggage and mail cars.

THE MISSOURI PACIFIC is inquiring for 13 baggage cars, 13 combination mail and baggage cars, 11 divided coaches, two observation type combination diner parlor cars, and one cafe club coach.

THE CHESAPEAKE & OHIO has ordered two all-steel dining cars, from the Pullman Car & Manufacturing Corporation. Inquiry for this equipment was reported in the *Railway Age* of September 1.

THE ATCHISON, TOPEKA & SANTA FE has authorized the purchase of the following equipment:

10 combination chair and smoking cars
10 combination mail and baggage cars
10 chair cars
10 day coaches
16 baggage cars, 70 ft. long.

Inquiries have been issued for the 16 baggage cars.

NEW YORK SUBWAYS—A public hearing will be held at the office of the board of transportation city of New York, December 19, at 11:30 a.m. on the proposed terms and conditions of the draft form of contract for furnishing and delivering cars and car equipment complete except for motors, for New York City's new subway system.

Machinery and Tools

THE ST. LOUIS SOUTHWESTERN has ordered from Manning, Maxwell & Moore, Inc., for its Pine Bluff, Ark., shops, a Putnam machine works 54-in. heavy duty motor driven tire turning lathe.

THE MISSOURI PACIFIC has ordered from Manning, Maxwell & Moore, Inc., a Warner & Swasey No. 3-a motor driven hollow hexagon turret lathe, a Doelger & Kirsten No. 4 motor driven low knife all steel alligator shear, with 36 in. blade, a Micro motor driven portable locomotive crank pin grinder, and a Shaw 15-ton, 46-ft. span overhead traveling crane.

Iron and Steel

THE DELAWARE, LACKAWANNA & WESTERN requirements of rail and accessories for 1929 total 10,000 tons.

THE SOUTHERN PACIFIC has ordered 1,500 tons of structural steel for miscellaneous bridge work from the American Bridge Company.

THE LOUISVILLE & NASHVILLE has ordered 1,300 tons of structural steel for miscellaneous bridge work from the American Bridge Company.

THE CLEVELAND UNION TERMINAL COMPANY has ordered 3,000 tons of structural steel for catenary bridges and other steel work required in the electrification of railroads entering the Cleveland Union station, from the Ft. Pitt Bridge Works.

THE WABASH has ordered 10,000 tons of rails from the Illinois Steel Company, 7,500 tons from the Inland Steel Company and 2000 tons from the Bethlehem Steel Company.

THE CHICAGO & NORTH WESTERN has ordered 20,000 tons of rails from the Illinois Steel Company and 8000 tons from the Inland Steel Company. Orders for 6000 tons of rails for the Chicago, St. Paul, Minneapolis & Omaha will be placed within a few days.

Signaling

Automatic Highway Gates

The Chicago, North Shore & Milwaukee has placed orders with the Standard Automatic Signal Corporation for 26 automatic electrically-operated safety gates for installation at highway crossings at Lake Bluff, Ill., Fort Sheridan, North Chicago, Waukegan, Zion, Kenosha, Wis., and Racine on the Shore Line route and at Main street, Evanston, Ill., Niles Center road, Glenview road, Willow road, Dundee road, Deerfield road and Deerfield avenue on the Skokie Valley route.

These orders follow previous experimental installations at three different points.

Miscellaneous

THE MISSOURI PACIFIC is inquiring for two clam shell steam shovels of 25 tons' capacity; one steam derrick of 150 tons' capacity and one spreader ditcher.

WORKING AGREEMENTS, DESIGNED TO ELIMINATE DUPLICATION of functions, have recently been entered into in Great Britain by the London, Midland & Scottish and the Great Western, according to reports made public by the United States Department of Commerce. The plan was first applied in the western part of England where facilities of the two companies overlap.

In one instance it was possible to divert all passenger traffic to the facilities of one of the roads while in the same locality the freight traffic facilities of one line were found adequate to the needs of both. At each of three other points it was found possible to close the passenger station of the London, Midland & Scottish and run its trains into the Great Western stations with substantial savings resulting.

Supply Trade

The Union Metal Products Company, with works at Hammond, Ind. has moved its Chicago office from 20 W. Jackson Blvd. to 310 South Michigan avenue.

The Vulca-Fibre Corporation, Chicago, has been incorporated to manufacture and sell vulcanized fibre dust guards.

Robert M. Knox, general superintendent of A. Guthrie & Co., Inc., St. Paul, Minn., has been elected vice-president, with headquarters as before at Chicago.

The McCarthy-Jones & Allen Company, Inc., 111 First avenue, South, Nashville, Tenn., has been appointed distributor for the Botfield Refractories Company, Philadelphia, Pa.

The Atlanta, Ga., office of the Cutler-Hammer Mfg. Co., was moved on December 1, into new quarters at 150 Peters street, S. W. A. C. Gibson is manager in charge of the Atlanta office.

Thomas I. Tutt, president of the Pennsylvania Tank Line, has established executive offices at 1936 Strauss building, 310 South Michigan avenue, Chicago, and J. P. McFadden, vice-president has established sales offices at 25 West Forty-third street, New York. The general offices remain at Sharon, Pa.

The Toncan Culvert Manufacturers' Association met at the executive offices of the Central Alloy Steel Corporation, Massillon, Ohio, during the week of November 20. A considerable expansion of the association's trade promotion activities was decided upon and will get under way immediately. Officers for the ensuing year were elected and a summer meeting was scheduled for August.

J. Harvey Hart has been appointed general purchasing agent of the Baldwin Locomotive Works, with headquarters at Eddystone, Pa. Mr. Hart entered the service of the Baldwin Locomotive Works in February 1893, and has been with the company continuously since then, with the exception of two years from November 1893 to November, 1895. He was first employed in the storeroom, and was transferred to the receiving department in June, 1896, and from there to the purchasing department in June 1905. He was appointed assistant purchasing agent on June 1, 1919, and served as purchasing agent since June 1922.

C. C. Creighton, district manager of the Galena Signal Oil Company, with headquarters at Chicago, has resigned to go with the Standard Oil Company of New York, as a special representative of its industrial lubrication division, which includes the railroad lubrication department. Mr. Creighton has had long experience in the railway field,

having served for many years in various departments of the Galena Signal Oil Company. During the World War he was a flying instructor in the British Royal Air Force. His new headquarters are at 26 Broadway, New York City.

The Johns-Manville Corporation has purchased the assets and the entire line of products of the Celite Products Company. The Celite Products Company will bring to Johns-Manville an annual business of over \$4,000,000, in net sales, of high temperature insulation and kindred lines, made from diatomaceous earth, a fossilized deposit derived from ancient sea life, and the Celite holdings of this deposit in California, which is one of the largest known sources of this kind and quality. In addition to insulating products, the Celite Company has been a large producer of filtration materials. Celite for concrete, one of the newer uses of Celite, is already one of the largest developments of this product. This business also will be developed by the Johns-Manville Corporation.

In announcing the appointment of Sidney G. Johnson as assistant to the president of the General Railway Signal Company, in the *Railway Age* of December 1, it was incorrectly stated that Mr. Johnson was with the Standard Railway Signal Company for 15 years. Actually he was with that company for three years, with the Union Switch & Signal Company for 15 years and with the General Railway Signal Company for six years—all prior to 1920. Mr. Johnson was a vice-president and director of the General Railway Signal Company when he resigned in 1920 to become president of the Johnson Railway Supply Corporation, New York City. He returned to the General Railway Signal Company as special representative on January 1, 1927 and served in that capacity until his appointment as assistant to the president.

T. H. Williams, who has been appointed manager of railway sales for the Electro-Chemical Engineering Cor-



T. H. Williams

poration, Chicago, was born at Beloit, Kan. He served a machinist apprenticeship on the Chicago, Milwaukee &

St. Paul and at the same time completed two engineering courses from the International Correspondence Schools, after which he spent five years as air brake and mechanical instructor on the instruction cars owned and operated by the International Correspondence Schools. He re-entered railroad service in 1905 with the Southern at Knoxville, Tenn., as roundhouse foreman and served as general foreman, division foreman and master mechanic until 1910 when he went to the International Great Northern as master mechanic. In January, 1914, he resigned to become mechanical expert for the Buda Company. Two years later he entered the sales force of the Chicago Cleveland Car Roofing Company and on November 1, 1927, left to join the sales organization of the Electric Service Supplies Company, where he remained until his recent appointment.

P. H. Simpson has been appointed sales engineer in the Railway Department of the **Edison Storage Battery Company**, with headquarters in New York City. He will specialize in railway carlighting batteries and industrial truck batteries. Mr. Simpson was born December 7, 1886, and received his technical education at Cooper Union University and Mechanic's Institute. He first entered the railway supply field in



P. H. Simpson

1902 as sales engineer to railroads for the Gould Coupler Company and the Gould Storage Battery Company. In 1918, he was made manager of Eastern sales for the carlighting department of the Gould Company, which position he held up to the time of the sale of the Gould Carlighting Corporation to the Simplex Equipment Company on December 31, 1927. He then joined the Sales Department of the Calorac Electric Corporation of New York and continued in this capacity until his present appointment.

Charles M. Muchnic, vice-president of the **American Locomotive Sales Corporation**, at New York, has resigned. Mr. Muchnic was born on March 17, 1877, and graduated from the Drexel Institute of Arts and Sciences, Philadelphia, Pa., in June, 1896. The same year he was employed in designing locomo-

tives at the Baldwin Locomotive Works and then, during 1897 and 1898, in designing locomotives at the Brooks Locomotive Works, which later became part of the American Locomotive Company. He was then, during 1899, in the designing department of the Cie. de Fives Lille, Fives Lille, France, engaged in designing locomotives embodying American features of construction, for service in China. From January, 1900, to the following July he was engaged in collaboration with Mr. DeGlehn, of the Societe Alsacienne des Construction Mecaniques, at Mulhouse, Alsace, in the design of the first four cylinder consolidation type of locomotive for service on the Midi Railway of France. He was then, until February 1901, technical and sales representative of the Baldwin Locomotive Works in Europe, with headquarters in Paris, and was in charge of its exhibit at the Paris Exposition. He was next appointed mechanical en-



Charles M. Muchnic

gineer of the Wisconsin Central at Fond du lac, Wis. From February, 1902, to the following November he served as mechanical engineer of the Denver & Rio Grande at Denver, Colo., and then to 1905 was assistant to the vice-president in charge of sales of the American Locomotive Company. From 1905 to 1915 he was manager of the foreign department of the same company and since that time has served as vice-president for the American Locomotive Sales Corporation.

P. N. Guthrie, Jr., has been appointed vice-president of the **Reading Iron Company**, and the general sales offices of the company will be transferred from Reading, Pa., to 30 Church street, New York City. Mr. Guthrie will have charge of sales and **H. F. Mattern** will continue as general sales manager. Mr. Guthrie was born in Pittsburgh in 1876, where he attended public and private schools. In 1892 he took a position with Park Brothers & Company, Black Diamond Steel Works, and served until March 1894 in several minor capacities. From March 1894 to February 1, 1900, Mr. Guthrie was with the Philadelphia Company, of Pittsburgh, as an inspector of pipe made by mills in the Pittsburgh district and was superintendent of the

pipe line and drilling work done by contractors for the company in West Virginia, Ohio, Kentucky, Tennessee and Pennsylvania. He served from 1900 to 1902 as general manager of the Hornell Gas Light Company, Hornellsville, N. Y., and then to 1906 as general manager of the Chemung County Gas Company, Elmira, N. Y. On February 1, 1906, he returned to Pittsburgh and be-



P. N. Guthrie, Jr.

came representative of Longmead Iron Company, manufacturers of wrought iron pipe, and in 1907 was transferred to Philadelphia as general sales manager of that company. In December 1909 he resigned to become New York representative of the South Chester Tube Company, with which company he has served continuously to the present time, except during the war period, August, 1917, to December, 1918, when he was assistant director, Bureau of Oil Well Supplies, Fuel Administration, Oil Division.

T. P. O'Brien has again become associated with the **O. M. Edwards Company**, Syracuse, N. Y.; he will have entire charge of the sales in the railroad traction and motor coach fields in the east-



T. P. O'Brien

ern and southern districts. Mr. O'Brien has opened a new office at 50 Church street, New York City, and will be assisted by **George G. Allison**. Mr. O'Brien started his career in the railroad

field in the service of the Pullman Company working in various capacities, finally having charge of the mechanical inspection in the Buffalo district, until 1910, when he left the Pullman Company to become associated with the O. M. Edwards Company and in 1916 he went with the Curtain Supply Company in its sales department having charge of the southern district. In 1922, Mr. O'Brien was made eastern sales manager for the Curtain Supply Com-



G. B. Allison

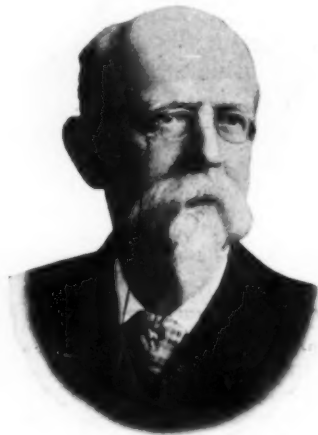
pany, remaining in that position until the company was merged with the Adams & Westlake Company in 1927, when he took charge of the combined eastern offices in New York City. Mr. Allison became associated with the Curtain Supply Company in the early part of 1919 and after three years service in the factory and general office, he became office manager. In 1922, Mr. Allison was transferred to the eastern sales office in New York City working under the direction of Mr. O'Brien. Mr. Allison will have charge of the southern district, with headquarters at 50 Church street, New York City. The growth of the O. M. Edwards Company in the last few years has made it necessary to increase both its selling and official staffs. The factory floor space has been enlarged and modern equipment installed to take care of the increased demand for Edwards' products, which are now going into the building trade in large quantities, in addition to the specialties made for the past forty years for railroad and traction service.

Obituary

Strickland L. Kneass, vice-president of William Sellers & Co., Inc., Philadelphia, Pa., died on November 24 at his home in Daylesford, Pa. Mr. Kneass served the Sellers Company continuously since September, 1880. After graduating from the Rensselaer Polytechnic Institute, he worked in its shops as a special apprentice and machinist; was transferred to the injector department experimental laboratory, and became identified with its injector business,

serving successively as foreman, superintendent, and manager before his election as a vice-president in February, 1927. He was the inventor of a number of improvements in the Sellers injector, as well as other devices connected with steam engineering, his latest invention being the Sellers exhaust feedwater heater injector. He was the author of *Practice and Theory of the Injector*, and a contributor to technical journals on thermodynamics, etc.

J. Snowden Bell, engineer and patent attorney specializing in the railway field, died on November 27 at his home in Brooklyn, N. Y. Mr. Bell was born at Philadelphia, Pa., on July 11, 1843, and received his early education at Central High School, that city, and the Polytechnic College, State of Pennsylvania, later being graduated from the University of Pennsylvania with an L.L.B. degree. During the Civil War Mr. Bell served in the navy as a marine engineer, and afterward became identified with the mechanical staff of the Baltimore & Ohio, serving as chief draftsman at its Mt. Clare shops. Leaving this latter position he assisted in the organization of the Pittsburgh Locomotive Works and here also served as chief draftsman. Mr. Bell next took up the practice of



J. Snowden Bell

law as a patent attorney in Pittsburgh, specializing particularly in the railway field. In connection with this latter practice he came to New York about 25 years ago and was actively engaged until within a few months of his death. He was associated with the American Locomotive Company as patent counsel and was the author of "Bell on Expert Testimony" as well as several technical papers and reports.

Trade Publication

THE NATIONAL SAFETY APPLIANCE COMPANY has issued a 12-page bulletin which includes a complete description of the National intermittent induction type of automatic train control. Diagram and illustrations explain all the latest developments in this equipment.

Construction

ATCHISON, TOPEKA & SANTA FE.—The California Railroad Commission has authorized the State Highway Commissioner and the Santa Fe to construct a grade separation structure to carry the Los Angeles-Santa Ana-San Diego highway over the tracks of this railroad at Irvine, Cal.

BIRMINGHAM SOUTHERN.—This company plans the expenditure of \$170,000 in connection with the construction of a grade separation project at Birmingham, Ala. It will include the raising of tracks and the rearrangement of yard tracks and connections with other railroads.

BARTLETT WESTERN.—Plans have been prepared for the construction of an extension from Bartlett, Tex., to Cameron, 35 miles.

CANADIAN NORTH-EASTERN.—This company plans the complete reconstruction of its present line from Stewart, B. C., at the head of the Portland Canal near the boundary between Alaska and Canada, through the Bear River valley, 15 miles, and in 1929 will make location surveys for the construction of extensions from Stewart to the Peace River country and to the northerly boundary of British Columbia, which will tap mineral resources. As projected eastward, the line will pass through the Ground Hog coal fields, about 125 miles from Stewart, the Ingenika district, about 200 miles from Stewart, finally reaching the Peace River district. The original charter of the railroad provided for these extensions and the project has been revived following the purchase of the railroad by Vancouver Holdings Limited, Vancouver, B. C. Application will be made to the next provincial legislature for a revival of the original charter.

LOS ANGELES HARBOR BOARD.—A contract has been let to B. W. Hicks, of Los Angeles, Cal., for grading the right of way for a connection between the Atchison Topeka & Santa Fe at Wilmington and the harbor and Los Angeles. Bids will be opened on Dec. 5 for the construction of abutments for a viaduct to carry the line over a boulevard.

LOUISVILLE & NASHVILLE.—A contract has been let to the Roberts & Schaefer Company, Chicago, for the construction of a 500-ton capacity reinforced concrete shallow pit automatic electric coaling station, a gravity sanding plant and two electric cinder plants at Sibert Yard, Mobile, Ala.

MISSOURI PACIFIC.—A contract has been awarded to the Blaser-Bollmer Construction Company, Wichita, Kan., for the construction of a one-story power house, which will have dimensions of 38 ft. by 40 ft., at Wichita, Kan. A contract for the construction of a one-story hostlers and engine supplies building with dimensions of 16 ft. by 48 ft. at East Bottoms, Kansas City, Mo., has been let to E. L. Winn, Kansas City.

MONTGOMERY.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a transfer connection to the tracks of the Baltimore & Ohio between Library and Snowden, Pa., 16,130 feet.

NEW YORK CENTRAL.—Five contracts have been awarded by this company for work on its lines in New York State. They are as follows: construction of a coach shop at Buffalo, to Frank G. Hansel, Buffalo, N. Y.; grading and paving on Twelfth avenue, New York, to William J. Fitzgerald, New York; elimination of a grade crossing at Martindale, to William M. Ballard, Inc., Syracuse, N. Y., repairing and strengthening of Pier 1 at 70th street, New York, to John C. Guise, Inc., New York, and the extension of platforms, canopies and shelter sheds at Harmon, to Miller-Blyth, Inc., New York.

NORFOLK & WESTERN.—This company has awarded a contract to W. W. Boxley & Co., of Roanoke, Va., for the construction of a section of track approximately 10.5 miles in length on its new Guyandot & Tug River extension in the Guyandot river valley, Va.

PENNSYLVANIA.—This company has awarded a contract to the Foundation Company, New York, for the building of masonry substructure for the bridge which it is constructing jointly with the state of New Jersey at Marion, N. J. This contract will involve an expenditure of approximately \$1,600,000.

PRINCE GEORGE & CHESTERFIELD.—This company has been authorized by the Interstate Commerce Commission to construct an extension, 16 miles in length, between Bellwood and Hopewell, Va. The project will also include the laying of approximately 4 miles of yard track, sidings, etc. The total cost is expected to be about \$1,000,000.

SOUTHERN PACIFIC.—The construction of a highway subway under the tracks of this company at Embarcadero road at Palo Alto, Cal., has been authorized by the California Railroad Commission. The cost of the structure, half of which is to be borne by the City of Palo Alto, will be about \$93,000.

ST. LOUIS & HANNIBAL.—This company plans the construction of a machine shop at Hannibal, Mo., to replace facilities that were recently destroyed by fire.

VIRGINIAN.—This company has awarded contracts for the construction of 16½ miles of new track on its line between Itmann and a point about 7 miles west of Pineville in W. Va., as follows: Eleven and one-half miles to the Walton Sud-duth Co., Bluefield, W. Va., and 5 miles to Waugh Brothers, Inc., Fayetteville, W. Va. The contracts will include the concrete substructures for one bridge, concrete and cast iron culverts. The total length of this new project planned by the Virginian in the Guyandot river valley is 41.9 miles, between Itmann and Gilbert, W. Va. Approximately \$535,000 is involved in the foregoing contracts.

Financial

ATCHISON, TOPEKA & SANTA FE.—Abandonment.—See New Mexico Central.

CHESAPEAKE & OHIO.—Hearing on Purchase of Pere Marquette Stock.—Testimony in support of the application of the Chesapeake & Ohio for authority from the Interstate Commerce Commission to pay \$133.33 a share for 174,900 shares of common stock of the Pere Marquette now held by the New York, Chicago & St. Louis was begun at a hearing before Director Mahaffie of the commission's Bureau of Finance on December 3. The commission authorized the purchase of the stock at \$110, the price fixed in an option given by the Nickel Plate which expired while the hearings were in progress, and the company seeks a modification of the order to enable it to take advantage of a new offer made by the Nickel Plate, based on the average market price of the stock from January 1 to June 11. Statistical exhibits were put into the record by A. Trevvett, secretary and treasurer of the C. & O., C. S. Sikes, vice-president and comptroller of the Pere Marquette and E. M. Thomas, comptroller of the C. & O., after which R. S. Marshall, vice-president of the C. & O., testified as to various compilations made from the exhibits on various bases of appraising the value of the Pere Marquette stock. He showed that the corporate surplus of the Pere Marquette has increased \$11.30 a share since 1926, which would indicate a present value per share of \$159.80 on the basis of book investment, and \$135.80 on the basis of the commission's final value adjusted, while on the basis of its recent earnings, estimated at \$15.40 a share for 1928, the stock should be worth \$154 a share, using a basis of ten times the earnings per share. For the past three years, he said, the earnings per share had averaged \$14.39, and whereas since 1922 the property investment has increased 24 per cent the net income has increased 56 per cent, largely due to increased efficiency of operation made possible by improved facilities. Mr. Marshall also said the P.M. would have a value to the C. & O. above its value as an independent road because it would enable the C. & O. to build up coal traffic to the territory served by the P.M. and would also increase the southbound traffic for movement over the Hocking Valley and C. & O..

W. J. Harahan, president of the C. & O., also testified briefly, saying he believed the proposed price is fair and one the C. & O. can afford to pay. He expressed the opinion that the P.M. can continue to earn \$14.50 per share and spoke of its "splendid" financial structure and good physical condition. The C. & O. witnesses were cross-examined by Henry W. Anderson, counsel for certain minority stockholders of the C. & O., but he said he had no witnesses of his own to present.

In support of the C. & O. application for a modification of the commission's order to enable it to issue 300,000 shares of its common stock at par instead of

200,000 shares at \$150, Frederick Strauss, of J. & W. Seligman & Co., expressed the opinion that the question of the price at which stock should be issued is one to be determined by the board of directors. Any attempt by governmental authority to regulate the price at which stock shall be sold, he said, is undesirable from the standpoint both of the public interest and that of the stockholders, and the commission, like everyone else, is utterly incapable of determining what the future market price of a stock may be. Briefs on the question of the stock issue are to be filed within 20 days.

CHICAGO & NORTH WESTERN.—Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue and sell \$3,577,000 of general mortgage 4½ per cent bonds of 1987, on account of the retirement, refunding or payment of a like amount of Milwaukee, Lake Shore & Western extension and improvement sinking fund mortgage bonds which fall due February 1, 1929.

COWLITZ CHEHALIS & CASCADE.—Bonds.—The Interstate Commerce Commission has authorized this company to issue \$60,000 of general and refunding 6 per cent gold bonds to be pledged as collateral for a similar issue of promissory notes and a previous order authorizing this bond issue for direct sale has been set aside.

DELAWARE & HUDSON.—Organization under New York railroad law.—This road has filed, in the office of the Secretary of State of New York, a certificate chartering a new corporation to acquire and organize its lines under the provisions of the New York Railroad Law. The certificate on incorporation states: "The railroad and railroad properties to be acquired by purchase or lease and maintained and operated are the line of railroad and the interests therein, now owned, leased and operated by the Delaware & Hudson Company, a corporation organized and existing under the laws of the State of New York, but not organized under the Railroad Law."

NEW MEXICO CENTRAL.—Abandonment.—The Interstate Commerce Commission has authorized this company to abandon its line between Torrance and Willard, N. M., a distance of 36 miles and between Santa Fe and Kennedy, N. M., a distance of 21.8 miles. The order also authorizes abandonment of operation by the Atchison, Topeka & Santa Fe, lessee.

NEW YORK, NEW HAVEN & HARTFORD.—Equipment Trust.—This company has applied to the Interstate Commerce Commission for authority for an issue of \$2,610,000 of 4½ per cent equipment trust certificates, to be offered for competitive bidding.

PITTSBURGH & WEST VIRGINIA.—Bonds.—This road has been authorized by the Interstate Commerce Commission to issue \$3,000,000 of first mortgage 4½ per cent bonds to be sold at not less than 94½ and accrued interest, the proceeds to be used for the construction of the applicant's extension in Pennsylvania. Action was deferred on that part of the applica-

tion which sought permission to issue \$7,000,000 of first mortgage bonds.

PRINCE GEORGE & CHESTERFIELD.—Construction Authorized.—This company has been authorized by the Interstate Commerce Commission to construct a line from a connection with the Seaboard Air Line at Bellwood, Va., to Hopewell, Va., a distance of 16 miles.

PRINCE GEORGE & CHESTERFIELD.—Securities.—The Interstate Commerce Commission has granted that part of this company's application seeking permission to issue \$5,000 of capital stock in 50 shares to be sold at not less than par, the proceeds to be used for general corporate purposes. Action was deferred on that part of the application in which the company sought authority to issue \$1,000,000 of first mortgage bonds, to be delivered to the Seaboard Air Line for advances to be made by the latter for construction of the applicant's line.

READING.—Acquisition.—This company has been authorized by the Interstate Commerce Commission to acquire the Bloomsburg & Sullivan, which extends from a connection with the applicant's line at Bloomsburg in a general northerly direction to Benton, Pa., approximately 20.26 miles.

SEABOARD AIR LINE.—Acquisition of Control.—The Interstate Commerce Commission has authorized this road to acquire control of the Prince George & Chesterfield by purchase of capital stock and by lease.

WHEELING & LAKE ERIE.—Argument in Anti-Trust Case.—Oral arguments were heard by the Interstate Commerce Commission on December 5 in connection with its complaint against the Baltimore & Ohio, New York Central, and New York, Chicago & St. Louis for alleged violation of the Clayton law in acquiring each 17 per cent of the stock of the Wheeling & Lake Erie. Thomas P. Healy, director of the commission's Bureau of Inquiry, said the law prohibits the acquisition of stock in a competing railroad which may have the effect of restraining competition and that the carriers are not relieved from the operation of the anti-trust laws until the commission has issued a proper order under section 5 of the interstate commerce act. He cited traffic statistics to show that there is competition between the trunk lines and the Wheeling and said that they had elected 12 of the 15 directors of the Wheeling, but he took the position that the Nickel Plate is on a different footing from the other two companies because of the smaller amount of competitive traffic. C. F. Taplin, counsel for the Pittsburgh & West Virginia, took the position that the Nickel Plate is "in the same boat" with the others, that it acted jointly with them in acquiring the stock and that with its connections it is competitive with the Wheeling. He said that if such transactions are to be permitted without approval of the commission it will result in a "wild orgy of buying up railroads." The arguments on behalf of the trunk lines were presented by R. Marsden Smith, gen-

eral attorney of the B. & O., J. H. Agate, assistant general counsel of the Nickel Plate, and Clyde Brown, general solicitor of the New York Central. They took the position that neither of the trunk lines had acquired control and that there was no concert between them for the control of the road and said that they had merely given their proxies by which the former directors of the road had been re-elected, pending their application for authority for officers of the three trunk lines to serve, which was denied. They contended that the statute does not apply to a mere purchase of stock in a competing road in the absence of a showing that something has been done or is likely to be done to restrain competition and contended that the record shows that nothing of the kind has been done. The argument was made that the purchase of stock was an investment, with the four-party plan in view, and Mr. Brown said that at the worst only a mistake has been made which could be remedied by the sale of the stock. He said that the proceeding might better have been devoted to a determination of who should have control of the Wheeling and that it was "perfectly absurd" to assume that the New York Central would seek to impair the value of its investment in the Wheeling for what it could get by suppressing its competition.

Valuation Reports

The Interstate Commerce Commission has issued final valuation reports finding the final value for rate making purposes, of the property owned and used for common-carrier purposes, as of the respective valuation dates, as follows:

Chicago & Calumet River.....	\$207,000	1919
Alton & Southern.....	1,856,000	1919
Kansas City Connecting.....	1,710,000	1919
Unity Railways.....	363,100	1920
Fort Smith & Western.....	4,928,300	1919

Average Price of Stocks and of Bonds

	Dec. 4	Last week	Last year
Average price of 20 representative railway stocks.	129.33	130.91	121.78
Average price of 20 representative railway bonds..	93.96	94.15	97.29

Dividends Declared

Atchison, Topeka & Santa Fe.—Preferred, \$2.50, semi-annually, payable February 1 to holders of record December 28.
 Buffalo & Susquehanna.—Preferred, 2 per cent, quarterly, payable December 31 to holders of record December 15.
 Chicago, North Shore & Milwaukee.—Prior lien, 1 3/4 per cent, quarterly; Preferred, 1 1/2 per cent, quarterly, both payable January 1 to holders of record December 15.
 Delaware, Lackawanna & Western.—\$2.50, quarterly, payable December 15 to holders of record December 1.
 Erie & Pittsburgh.—\$.87 1/2, quarterly, payable December 10 to holders of record November 30.
 Missouri Pacific.—Common Initial, \$1.25, quarterly; Preferred, \$1.50, extra, both payable December 31 to holders of record December 15.
 Texas & Pacific.—Common, \$1.25, quarterly.

THE INTERNATIONAL-GREAT NORTHERN AND THE KANSAS CITY SOUTHERN have placed their sleeping car service between Kansas City, Mo., and Houston, Tex., on a 24-hour schedule, thereby saving 2 hours as compared with the old running time. Cars now leave Kansas City at 5:20 p.m. and arrive in Houston at 5:20 p.m. North-bound they leave Houston at 12:45 p.m. and arrive in Kansas City at 1:00 p.m.

Officers

Executive

Harry H. Kiernan, executive clerk in the office of the president of the Illinois Central at Chicago, has been appointed assistant to the president of the Peoria & Pekin Union, devoting his time to the solicitation of freight on the Pacific Coast, with headquarters at Seattle, Wash., and later at San Francisco, Cal.

Robert J. Bowman, who has been appointed assistant vice-president of the Erie, with headquarters at New York, was born on April 15, 1891, at Fostoria, O. He entered railway service on February 7, 1907, with the New York, Chicago & St. Louis, serving as freight clerk at Mortimer, O., until October, 1910. He later served as agent, operator and relief agent and from December, 1914, to August, 1915, he was in the dispatcher's and superintendent's office at Ft. Wayne, Ind. He served



Robert J. Bowman

as chief clerk to the superintendent at Fort Wayne until November, 1918, and was then transferred to the general office at Cleveland, O. He subsequently served as chief clerk to the superintendent of freight transportation and chief clerk in the general superintendent's office. From March 1, 1920, to January 1, 1927, he was chief clerk to the president, and on the latter date he left the service of the Nickel Plate with President Bernet to go to the Erie in the same capacity. Mr. Bowman was appointed assistant to the president of the Erie on February 14, 1927, in which capacity he served until his recent appointment.

Robert E. Woodruff, who has been appointed assistant vice-president of the Erie, with headquarters at New York, was born in 1884 at Green Bay, Wis., and was educated at Purdue University. He entered railway service in 1905 as a section hand on the Erie and until March, 1909, served consecutively as

track foreman, construction engineer, assistant division engineer, division engineer at Meadville, Pa., and trainmaster. From March, 1909, to November of the following year, he was general agent of the operating department at Chicago, then being appointed superintendent at Rochester, N. Y., in which position he served until May, 1912. From the latter date until November 1, 1916, he was superintendent at Marion, O., he



Robert E. Woodruff

was then appointed superintendent at Youngstown, O., where he remained until November, 1917. He served as superintendent of transportation from November, 1917, until June, 1918, when he was appointed general superintendent of the Lines West. On March 1, 1920, he became manager of the Hornell region, with headquarters at Hornell, N. Y., later being appointed division superintendent at Buffalo. He was appointed general manager, Eastern district, in February, 1927, having jurisdiction over lines west of Port Jervis, N. Y., and Stroudsburg, Pa., to and including Buffalo and Salamanca, N. Y., in which capacity he served until his recent appointment.

Financial, Legal and Accounting

O. M. Helper, assistant to comptroller of the Chesapeake & Ohio, has been appointed assistant comptroller, with headquarters at Richmond, Va. Mr. Helper has been in the service of the Chesapeake & Ohio since 1907 having served as stenographer in the comptroller's office, secretary to the comptroller, chief clerk to the comptroller, and assistant to the comptroller, in which position he served until his recent appointment, which became effective November 1.

Operating

F. A. Bogue, trainmaster on the Chicago, Rock Island & Pacific, has been appointed acting superintendent of the Nebraska-Colorado division, with head-

quarters at Fairbury, Neb., temporarily succeeding **E. D. Hungerford**, who has been granted a leave of absence on account of illness.

Thomas L. Grady, assistant trainmaster of the Pennsylvania, with headquarters at Pittsburgh, Pa., has been appointed passenger trainmaster, Baltimore division, with headquarters at Baltimore, Md., succeeding **T. A. O'Toole**, promoted.

L. E. Windham has been appointed trainmaster of the Jacksonville district of the Atlantic Coast Line, with headquarters at Sanford, Fla., with assigned territory from Sanford to Leesburg, Fort Mason to Astor, Tavares to Lane Park, Swan Lake to Trilby, and Kissimmee to Apopka. **S. E. Jones**, trainmaster, is assigned territory from Jacksonville to Sanford, including Sanford terminal, and Sanford and Everglades, Lake Charm and DeLand Branches.

Traffic

K. G. Miller has been appointed assistant general freight agent of the Seaboard Air Line, with headquarters at Norfolk, Va., succeeding **O. C. Abrams**, resigned.

E. W. Goslee, district freight agent of the Gulf, Mobile & Northern at Detroit, Mich., has been promoted to eastern freight agent, with headquarters at New York.

Lucien Snow, assistant freight traffic manager of the Maine Central, with headquarters at Portland, Me., has been appointed assistant freight traffic manager of the Portland Terminal Company, with headquarters as before at Portland, Me.

J. H. Carroll, Jr., general freight agent of the Baltimore & Ohio, with headquarters at Pittsburgh, Pa., has been appointed freight traffic manager, with the same headquarters. He will be succeeded as general freight agent at Pittsburgh by **A. L. Doggett**, now assistant general freight agent at the same point. Mr. Carroll will have charge of the territory from Triadelphia, W. Va., to Pittsburgh, Pa.; west of Connellsville, Pa. and Holloway, O., to Willard, O., exclusive, including branches.

Everett D. Davis, who has been appointed assistant freight traffic manager on the Buffalo, Rochester & Pittsburgh, with headquarters at Rochester, N. Y., was born on January 18, 1892, at Elizabeth, N. J. He was educated at Hotchkiss School, Lakeville, Conn., and Yale University, and entered the service of the Buffalo, Rochester & Pittsburgh in August, 1914, as clerk in the Tariff Bureau, later being transferred to a local freight office. He was appointed soliciting freight agent at Rochester in March, 1916, and in December of the same year he was promoted to division freight agent, with the same headquarters. In March, 1922, he was promoted to as-

sistant general freight agent and the following December he was appointed general freight agent, which position he held at the time of this recent appointment to assistant freight traffic manager. In May, 1920, Mr. Davis was also appointed general freight agent of the Reynoldsville & Fall Creek Railroad, which position he still holds.

Elbert L. Whitney, who has been appointed general coal and ore agent of the New York Central lines west of Buffalo, N. Y., and the Ohio Central lines, with headquarters at Cleveland, Ohio, was born at Columbus, Ohio, on October 18, 1874. He entered railway service as an office boy on the Baltimore & Ohio at Columbus, then occupy-



Elbert L. Whitney

ing various clerical positions until 1900 when he became chief clerk in the traffic department of the Toledo, St. Louis & Western (now part of the New York, Chicago & St. Louis) at Toledo, Ohio. Three years later he was advanced as commercial agent at Detroit, Mich., and from 1904 to 1908 he conducted a traffic service for shippers. In the latter year Mr. Whitney re-entered railway service on the Pittsburgh & Lake Erie, being appointed chief clerk to the assistant freight traffic manager of the New York Central at Chicago in 1910. He advanced through various positions in the traffic department and on May 1, 1920, he was promoted to assistant general freight agent at Chicago. On October 1, 1922, Mr. Whitney became assistant to the vice-president of the Indiana Harbor Belt, the Chicago Junction and the Chicago River & Indiana, with headquarters at Chicago. His appointment as general coal and ore agent of the New York Central at Cleveland became effective on November 16.

Henry W. Forward, assistant freight traffic manager of the Erie lines west of Buffalo, N. Y., and Salamanca, has been promoted to freight traffic manager, with headquarters as before at Chicago, succeeding **F. D. Austin**, who has been assigned to other duties. **F. G. Lantz** and **William V. Kennedy**, general freight agents at Chicago, have been promoted to assistant freight traffic managers, with headquarters at the same

point. **J. G. Hill**, assistant general freight agent, has been promoted to general freight agent, with headquarters as before at Chicago.

Mechanical

James A. Anderson, who has been promoted to assistant superintendent of motive power of the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Milwaukee, Wis., was born at Deals Island, Md., on July 9, 1883. He graduated from Maryland State College in 1904 with the degree of mechanical engineer and entered railway service in August of the same year as a special apprentice at the Mt. Clare shops of the Baltimore & Ohio at Baltimore, Md. After completing the apprentice course, Mr. Anderson was employed in the B. & O. test department, entering the shops at Garrett, Ind., as a machinist in March, 1907. Later he served as assistant foreman and enginehouse foreman at that point and in 1909 he was advanced to general foreman of the locomotive and car departments at Holloway, Ohio, where he remained until 1911 when he became motive power inspector of the West Virginia district of the B. & O. From 1912 to 1913 Mr. Anderson served as assistant road foreman of engines at Canal Dover, Ohio, and as assistant trainmaster and he was then promoted to master mechanic at Lorain, Ohio, later being transferred to Grafton, W. Va., and Benwood. He was further promoted to assistant superintendent of the Baltimore & Ohio shops at Pittsburgh, Pa., in 1919, and on February 1, 1920, he was appointed superintendent of the Milwaukee shops of the Milwaukee. His promotion to assistant superintendent of motive power in charge of shops and machinery for the system became effective on November 15.

Engineering, Maintenance of Way and Signaling

M. F. Longwill, assistant to the president of the Wabash, has been appointed chief engineer, with headquarters as before at St. Louis, Mo., succeeding **R. H. Howard**, deceased.

W. A. Parker, division engineer on the Union Pacific at Marysville, Kan., has retired under the pension rules of the company, following a leave of absence because of illness.

J. S. Gensheimer, engineer of telegraph and signals of the Pennsylvania, with headquarters at Pittsburgh, Pa., has been appointed engineer of telegraph and signals, New York Zone, in charge of the telegraph and signal department, with headquarters at New York.

Benjamin F. Dickinson, supervisor of telegraph and signals of the Pennsyl-

vania, with headquarters at Jersey City, N. J., has been appointed Engineer of telegraph and signals, with headquarters at Pittsburgh, Pa. Mr. Dickinson was born on November 26, 1884, at Philadelphia, Pa., and was educated in the public schools and Drexel and Spring Garden Institutes. He entered the service of the Pennsylvania in April, 1898, serving in various capacities in the signal department until February, 1904. He was then appointed signal repairman, later being appointed assistant inspector of signals. Mr. Dickinson was promoted to the position of assistant supervisor of signals of the New York division in July, 1909. He subsequently served as supervisor of signals on various divisions and in 1920 he was appointed supervisor of telegraph and signals of the Philadelphia division. He was then appointed inspector of signals for the Eastern region, serving in that capacity until May, 1, 1927, when he became supervisor of telegraph and signals of the New York division, which position he held at the time of his recent appointment as engineer of telegraph and signals.

Obituary

T. Grant Delph, trainmaster on the Nashville, Chattanooga & St. Louis at Atlanta, Ga., died at his home in that city on November 3, following an attack of pneumonia.

Frank J. Burke, land and industrial commissioner of the Texas & Pacific, with headquarters at Dallas, Tex., died at his home in that city on November 26 from heart disease.

Charles E. Leatsch, assistant auditor of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., died at his home in that city on November 28.

Michael J. Gallagher, trainmaster on the Chicago, Milwaukee, St. Paul & Pacific at Council Bluffs, Ia., died at his home in that city on November 22, after 43 years of service with the Milwaukee.

William Garland, who was president of the Gila Valley, Globe & Northern from its organization and construction in 1894 until it was taken over by the Southern Pacific in 1904, died at his home in Los Angeles, Cal., on November 24.

Guy Adams, general baggage agent of the Los Angeles & Salt Lake, with headquarters at Los Angeles, Cal., died while on a Pacific Electric train near that city on November 30. Mr. Adams was appointed supervisor of mails of the Chicago, Rock Island & Pacific, with headquarters at Chicago, in 1904 and at the time of his appointment to general baggage agent on the L. A. & S. L. in 1913 he was also mail traffic manager on the Chicago & Eastern Illinois and

the St. Louis-San Francisco, with headquarters at Chicago and St. Louis, Mo.

D. B. Johnston, assistant engineer of maintenance of way in the office of the chief engineer of maintenance of way of the Western region of the Pennsylvania, with headquarters at Chicago, died at Logansport, Ind., on November 27 following a six-month's illness. From 1898 to early in 1928, Mr. Johnston had served successively as engineer of maintenance of way of the Cincinnati & Muskingum Valley (now part of the Pennsylvania) at Zanesville, Ohio, as engineer of maintenance of way of the Pennsylvania at Louisville, Ky., and as division engineer at Louisville and Logansport, Ind.

Edwin Leslie Bevington, chairman of the Trans-Continental Passenger Association, with headquarters at Chicago, died at his hotel in that city on November 28 following an illness from pneumonia. Mr. Bevington had been connected with individual railways and with the Trans-Continental Association for nearly 46 years. He was born on February 22, 1866, at New Lenox, Ill., and received his academic education in high school, business college and under private instruction. He entered railway service as a bill clerk on the Chicago & North Western and in March, 1883, he



Edwin Leslie Bevington.

became connected with the passenger department of the Chicago & Alton. For the next 17 years he advanced successively through various positions in that department. During 1900 and 1901 Mr. Bevington was general manager of the Denver, Boulder & Northern, with headquarters at Denver, Colo., then becoming secretary of the Trans-Continental Passenger Association at Chicago in the latter year. He had been president of the Association since October 15, 1915, and at the time of his death was also chairman of the Western Military Bureau, the General Folder Distributing Agency and the Tourist Travel Clearing Agency. During the World war Mr. Bevington served as assistant director of the division of traffic of the United States Railroad Administration.